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## MAKING THE VIRTUAL REAL, AND THE REAL VIRTUAL: THE 2000 PC FORUM ON PAPER

*By Esther Dyson and Kevin Werbach*

*For the past two centuries, we have been building a world based on industrialization, automation, economies of scale. In order to have power, to be heard, to be productive, you had to join up with some great institution, whether a government body, a factory, or a publication/ broadcaster. Individuals working together through these institutions could produce more than they could alone. Individuals also looked to institutions for respect, identity and other benefits. (Of course there were countervailing tendencies, especially in the US and outside the business world, but "mass" everything was the big economic story.)*

In a contrary vein, over the past 30 years, we have been building a virtual world based on self-organization, interacting parts and unpredictable innovation. In this world, a single voice could be heard, diversity flourished, and individuals were empowered. This is the world we in high-tech have all focused on.

But it's an artificial world, connected to the real world only through people. People enter data, and people read the output; the virtual world generally has little relationship to the real world.

Tell a computer that you're in zip code 10011, and it will believe you. Tell it that you're a 13-year-old girl, not a law enforcement officer, and it will believe you. Give it the right password, and it will believe you. Tell it the inventory is all there, and it will believe you.

But now these two worlds, once tenuously linked, need to be -- and are becoming -- more tightly connected. As with most things, better knowledge allows systems to ===>

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serve people better. It also impinges on their freedom. We may want a world without fraud; do we want a world without the freedom to disappear?

**Converging worlds; exploding questions**

The convergence of these two worlds -- real and virtual -- is the theme of this Forum. We explore it from many angles, both business and social. There are practical and technical considerations: How do we build in the connections? How can we scale up? How can we find our way around? Distance keeps the vastness of the real world manageable, because we encounter only subsets of it at a time; the virtual world is all there instantly -- if you just know which minuscule portion you want.

How do the economics of scale interact with the economics of diversity/ fluidity/flexibility? How does human nature interact with non-geographical boundaries? In the physical world we have dress codes, a sort of gentle boundary, and the ability to raise your hand in a meeting; in cyberspace, we have positive IDs, authentication, spam filters and the like. How can we put fuzziness and friction and privacy into cyberspace?

Legal and commercial forms also morph in cyberspace. Because the costs of communication are lower, companies no longer need to be vertically integrated, and so they form alliances and outsource non-core functions to application service providers (ASPs). Yet at the same time we have mega-mergers. What gives?

Markets are becoming increasingly fluid and efficient, and private marketplaces are taking on some regulatory functions, even as governments try to figure out how (or even whether) to regulate this new turf. One of the most interesting scientific hypotheses recently suggests that asthma is caused by insufficient exposure to germs, which makes people's immune systems overreact. Do we need the equivalent of an ambient level of germs in cyberspace to keep us healthy?

Meanwhile, how can people invest in their communities? Or is philanthropy simply investment on a longer time scale, where the returns come to one's environment rather than to one's digital wallet? Often, the same motivation applies -- to build something that *works*!

*All these speeches, panels and discussions are only a start. We hope that you enjoy the next three days -- or the next 69 pages -- and the questions they raise.*

MONDAY, MARCH 13

## PANEL: BOUNDARIES -- NOT JUST PHYSICAL

*Contrary to some rhetoric, the Net is not a community; it's a platform for communities. The technical interoperability and openness that made it so successful (and that informed the culture it had when it was a community, mostly of research scientists) have given way to a variety of cultural, commercial, legal and other barriers. These barriers both bind people into communities, and keep outsiders out. But these communities and groups overlap; most individuals travel among several communities, and many have several identities.*

*What's the best way to reach people -- one by one, in communities, in segments, en masse? Will anonymity flourish, or will it be rendered difficult or impossible by legal and commercial considerations? Where's the balance of power between community members and the community owners (if that term even makes sense)? Think of Net communities/identity as being closer to an immune system (with distributed identity) rather than a central nervous system controlled from one point.*

*Businesses have a very concrete interest in boundaries; it's what used to be called market segmentation. The four people on this panel bring different points of view. Some have easily defined markets; others, notably Time Warner, are so large that they need to address almost everyone; for them, language may be the last boundary. Should you start with a kernel, or with a spin-off? That is, do you want to extend an existing community, or grow a new one bottom-up? What is the role of content? Is it like art on the walls, or is it actually "useful?" Who sets the rules, the members or the owners?*

*The contrast between, say, Women.com and VerticalNet raises one of the more interesting questions about communities. Are they fractal? Do communities form randomly, so that there is no single "best" community in a particular segment, so that a community is "best" to its own members simply because it is theirs? Women, for example, may get the same information from a general site or from a women's site, but feel more comfortable with other women. Social communities benefit from a sort of speciation: You want to be with your own kind -- only. By contrast, the best markets are open. There's value to being the only one, with a winner-takes-all tendency.*

### Richard Bressler, chmn. & ceo, Time Warner Digital Media -- At eye level

How does a mild-mannered accountant become chairman and ceo of Time Warner Digital Media? In Bressler's case, the path began at Ernst & Young. As the firm's youngest partner ever, he was an attractive target for his client, Time Inc., which he joined in 1989 as assistant controller. In 1990, he became a corporate vice president of Time Warner, and in 1995 he became cfo of the whole company. That got him involved in strategy, trying to figure out how to make a coherent whole out of Time Warner's diverse activities -- including its fledgling online ventures. You could argue that they didn't need control from above, but in a world of partnerships and alliances, they at least needed some synergy and collaboration horizontally.

"Those years as cfo, especially the last couple, were very important," says Bressler. "I was working to help set the strategy for the company sitting at the side of Jerry [Levin], Ted [Turner], Dick [Parsons], the board of directors. As cfo, you have to take a view over the whole asset base. You see all the nooks and crannies, the winners and the leaks.... But you also have to watch the environment. Shareholders pay us to see the trends and adapt to the changes early. It's easy to follow, it's tougher to lead...like with the AOL deal. Not everyone thought -- or thinks! -- it's a good idea."

But Bressler himself does: "The notion was -- because the Net and digital media touched each of our assets -- that we had to significantly accelerate our move into the digital world. Who could we partner with? That was the impetus. The only one we felt comfortable with, the only one that could make a difference, was AOL. Everyone avoids this dreaded word convergence because they don't know what it means, but that's what we have to achieve."

He saw it strategically but he also saw it at home. "Before I started being interested in it officially...I have two kids, 13 and 15. I always want to be on my hands and knees at their height seeing the world through their eyes. I saw them on the Net; I saw the time they spent on it increasing, chatting with their friends. And then when I asked them to show me the Net, they showed me AOL. For them, that was the Net. At the other extreme, there's my parents-in-law! If you had told me a year ago that either they would be on the Net or a space ship would land on their lawn, I would have gone out to buy green candy for the little men. But they're sending e-mail, shopping for cars, food-shopping."

That experience -- which continues -- convinced him of the potential. "The guys on the AOL side know how to create a great consumer environment; our guys know how to make great content. One of the most immediate synergies will be in music -- currently about 10 percent of TW's earnings. We were asking, 'Is there a deal that can accelerate the digital downloading of music?' We'll find ways to ensure secure distribution. Copyright is key."

Couldn't there be other business models? we ask. "You have to believe that the artists are in the business to make money. Other business models, taking a product and bundling it with something, that will never make up for giving your music away or discounting your music. But I'm quite confident. The people that have pirated music have always pirated music, and we have learned how to deal with it. As long as artists want to make money, they'll need us to promote it and distribute it." Well, we can have an interesting discussion!

Bressler is also excited about the other areas: "High-speed Net access, cable systems.... Broadband will let us create new applications, new interaction mechanisms. There are so many things we're looking at, because of AOL's user base. We can use it for cross-promotion and interactive television, all kinds of things."

Meanwhile the business world at large wonders about the meaning of the deal for antitrust, for industry structure, for their own futures and their jobs. The conventional wisdom says a content company is meeting a community company: AOL knows how to use content to build communities of eager consumers who chat with one another, buy stuff, and draw each other in. The amazing thing about AOL is how large an audience (22 million) it has built with so little content. Much of its content now comes from third parties who *pay* AOL for carriage. So why is it paying Time Warner for what is essentially a content machine -- the capability of creating new, fresh brand-name content consistently? Or was it the cable system? AOL has now stopped lobbying for “government-mandated” open access since it no longer needs it.

As they ponder these questions, investment bankers are producing reams of paper, analyzing hypothetical deals and making calls. VCs are wondering how this will affect valuations. Is the industry really consolidating? Europeans are wondering how to match this latest coup on their continent -- Bertelsmann and who? T-Online and who?

Nonetheless, the more interesting questions may be local and less (apparently) strategic: How can the two cultures mesh? Or will this simply be two more far-flung empires with common ownership? Will the relationship hamper each partner’s freedom to make alliances elsewhere? Bressler says: “The biggest challenge is execution. It’s easy to sit here; it’s one thing to put a deal together, another thing to execute. But I’m confident we can retain our people and our excitement. We’ve already got significant number of people that don’t need to work anymore to eat, that don’t go for the blue-plate specials. There’s no greater playground in the world right now than the Time Warner/AOL asset base. Both companies have done a good job of keeping their entrepreneurial spirit, and this gives them the ultimate opportunity to make a real difference. Everybody’s really juiced about this!”

### Marleen McDaniel, chairman & ceo, Women.com Networks -- Marleen.com

Marleen McDaniel studied psychology at Berkeley back in the late 60s because that’s what her sister had studied. But to help pay her way through school, she worked at Quantum Sciences, and that, rather than her formal education, shaped her career. She researched the electronic components marketplace at Quantum and then left at 24 to form another research firm, Gnostic Concepts, with five partners. That led to a string of jobs -- mostly management and marketing -- at start-ups including Tymshare (where she worked with fellow speaker Dan Lynch; page 20), 3Com, Sun Microsystems and Crescendo Communications. When Crescendo was sold to Cisco in 1993, she went to yet another start-up, a dial-up women’s network then called Women’s Wire.

Since then, renamed Women.com and moved to the Web, it has grown to attract nearly 5 million visitors each month. In her six years there, McDaniel has established alliances with companies such as Hearst Publications, Torstar/Harlequin, Disney, Hallmark, MediaOne, Mitsui Comtek, Rodale Press and AOL.

Of all the mainstream sites, says McDaniel, Women.com's audience skews most female -- about 80 percent. "Probably our name," she laughs. "Walt Mossberg [of the *Wall Street Journal*] said he didn't know what was so female about it. We don't try to make it fluffy. It's not all about lipstick. There's very interesting information up there: We did a feature on bachelors of Silicon Valley that got national publicity. It attracted a lot of men who wanted to see what's going on. Perhaps they were wondering why they weren't picked!"

Overall, she says, the target audience is all women 18 to 49: "Through different kinds of targeting, we get to both working women and housewives. The food and cooking channel appeals more in the Midwest, whereas career and finance are more bicoastal. It's a network of channels, not a single site," -- much as VerticalNet, below, is an aggregation of different sites, some related, some not.

The service has its own chats and bulletin boards and community features, but content is a key -- and costly -- part of the model. Take the romance channel, consisting primarily of information sponsored by Harlequin, which sells 250 million books a year, mostly by direct mail -- but Net sales should grow rapidly. "The addicts who read these novels, that's a niche," says McDaniel. "We offer them new dramas created from the books. We have the authors, discussion groups, serialized dramas, create your own endings.... There's a lot of content in there."

McDaniel makes canny use of partnerships: The site has alliances with 12 magazines and two tv shows. "We like it when some media companies try the Net and don't succeed; it makes them more humble," she says. That refers to Hearst as well? we ask. "I really enjoy working with Hearst; I think they have much more compassion because they did try this themselves," says McDaniel.

Hearst Communications is one of Women.com's flagship partners, and owns about 46 percent of the now-public company. They also have a strong business partnership. Women.com won the production business for the Hearst magazine sites, has exclusive rights to distribute the magazine sites, and sells advertising for those sites. And of course, Hearst promotes Women.com heavily in its print magazines, including *Cosmo*, *Redbook* and *Victoria*.

"The community side is becoming more important," she says, "but communities are not a total solution. People like expert advice and editorial content. When, say, the *Victoria* magazine editor takes the time to go into a community, it increases traffic.... We still benefit from that editorial authority. Communities tend to form around compelling topics and then get very sticky. You write in, and then you want to see how people react to your comments. These message boards tend to range to the outrageous. One of the most lively ones right now is 'Initiative majority 2000' for the elections. It's a public-policy board of mostly Washington experts, and they have raised enormous controversy. Even the selection of the committee was controversial."

So what drives women to the site in the first place? Will there still be a need for a women's site in 10 years? "I don't know that we need these things; we **want** them," says McDaniel. "It's a place for women to go on a wide variety of topics. Some things are just intrinsically female:

information from other people going through the same things you are. A baby, a wedding, menopause. Lifestage information. There are times in your life when you particularly want advice or company of other women."

"On the other hand, there are some topics some women are not comfortable with, and we can present them in an informative but non-threatening way. I'll be honest. Our financial site is not the most popular. Personally, I'll go to CNBC or Schwab, but ours is for people who are not yet comfortable going to a mainstream finance site. The editorial voice varies from channel to channel. You don't want to talk down, but many women are not that savvy about investing. And it's a huge advertising category."

On the international side, notes McDaniel, "Take any one of these American portals, including ours: 20 to 30 percent of the traffic is from outside the US, but that's not enough to make it a global brand. Only about half of what we do translates culturally. You can throw out whole channels that just aren't relevant. This just says that we might be actively interested in buying content properties overseas."

The company already has some overseas activities. It has just launched a Japanese-language (and -culture) Website with Mitsui Comtek, Sankei Living and Dentsu. And it is actively pursuing other international joint ventures as well as licensing some of its content.

### Tony Salter, ceo, Boxman -- Traveling man goes far

Tony Salter is the ceo of Boxman, Europe's largest online retailer -- or at least one of the top three, since it's not clear how it should be measured. Salter is relaxed about that; he's more concerned with Boxman's performance than its place in Internet history (i.e. the last and the next three months).

Boxman was founded in Sweden by the owners of a chain of video shops. Even as they went online, they cleverly decided to focus on the market of CD buyers rather than the market of people who were online at the time in Sweden. That was fewer than now, but in the late 90s the Swedish government promulgated policies that encouraged companies to subsidize PCs for their employees...imagine that a whole countryful of employers did what Ford and Delta have just announced for their workers. So as hundreds of thousands of Swedes went online for the first time, one thing they had already heard about was Boxman. Mostly because of Boxman, a high five percent of total CD sales were made online in Sweden last year.

Meanwhile, Salter was learning about the Internet when it was still called multimedia in most places. Salter, probably the only executive with an ISP account at EMI Europe at the time (1993), was put in charge of multimedia, alongside his day job as President of EMI's Central and Eastern Europe division. He remained at EMI until 1998, and then joined Boxman in 1999 to lead its roll-out into other markets. Boxman now has offices in eight countries across Europe, with five more to follow in 2000. Perhaps more significantly, it has invested heavily in building a centralized pan-European IT and logistics infrastructure. It now has about 20 percent of online CD sales in Europe, which themselves are much higher in Northern Europe and the UK than in Europe overall.

So what's the key thing about expanding into other geographical markets? we asked. "The answer is short," he answers briefly. "You recognize it's a different culture, and you believe it in your heart." We probed a little more: "I have traveled a lot. I started traveling when I was 18, and I have lived abroad 12 years since I turned 21. I have worked in international all my life. In fact, my Italian boss at EMI didn't even consider me British," he concludes proudly. Although Boxman is headquartered near Oxford, he has never worked in the UK market specifically.

On the roll-out however, he contradicts conventional wisdom to some extent. "We are not a conglomerate of individual full-function companies in each market with duplicate management functions everywhere. We have a marketing-driven person in each market, together with customer service, partnership teams and Webmasters, but our back-office infrastructure is designed to operate worldwide from a few hubs -- currently Holland, to be followed this summer by the US and eventually Asia.

"When you move to downloading, that kind of centralized structure will be even more appropriate. Why have a server in each capital to download the same music? Why have a management team and culture designed to support local logistics, finance and IT when those functions can be managed from anywhere (or in the case of logistics for music, will be irrelevant)? So we are appropriately designed for the future. There are some quite painful parts: We have a big SAP backend, more than we need right now. The European Union provides a benefit in competition law, but we need to accommodate different regulations, different VAT rates, stuff like that."

And it's more than just regulations. For example, you can try to do the customer a favor by shipping each item as soon as it's available, but if that means a trip to the Post Office, as it does in many countries, the customer won't appreciate the favor. "Can't you just ask what the customer would prefer?" we suggest, to which Salter replies, "Of course! And the answers just confirm that you can't apply a common set of practices to all countries or even within a country. People have different priorities and, if you ignore that, you can never be the long-term winner."

While Salter agrees that Boxman has some influence over offline pricing, he attributes most of the music industry's difficulties neither to Boxman nor to downloading. "I quit EMI at the end of 1994 and came back as a consultant to take a broader view. I looked at the European business and it was clear what was happening: structural problems, not the Internet. CDs were reaching maturity. For years we'd had the luxury of format replacement: People were buying new content and paying three or four times as much as they were paying for cassettes while at the same time replacing their existing collections in new media. That opportunity runs out and you have to come back to reality. For the last few years the drivers lowering prices have been the hypermarkets and the Euro; it's not the Internet companies. I believe that we will be able to start to offer a wide range of titles for Web downloading this autumn.

"Now will people buy? Not very many for some years. Physical retail still represents 98 percent of the European entertainment retail business. Right now, even though we're the first pan-European music retailer, we're just a little Internet company, and we're trying to bark as loud as we can."

## Mark Walsh, president & ceo, VerticalNet -- Big fish in many small ponds

Mark Walsh comes from a mass-media family; it was his mother's voice that called for "More Park sausages, Mom!" on the radio commercial that ran from 1959 to 1983. He started his own television career at a high level in a small community: After graduating from Union College in Schenectady, NY, he signed on as the ad salesman for one of the two television stations in Clarksburg, West Virginia, market number 142 out of 200 in the US. Ten seconds on Johnny Carson went for $10, he recalls. When the anchorman quit one day, Walsh was immediately promoted to become Clarksburg's primary on-air personality.

After a Harvard MBA in 1980 for what he calls "validation," he moved to HBO, the new cable channel, and worked on ways of acquiring new members. Then he joined the online group of CUC International, where he was vp and general manager of interactive services, shopping and travel (and had nothing to do with accounting, he notes). Next, he was the first and last president for GE's GEnie service, and then joined AOL for a little more than two years. "I was the B2B person at AOL, which is equivalent to being the electric car guy at GM," Walsh says. From there he was lured by Internet Capital Group to run VerticalNet, which at the time (September 1997) had a market capitalization of $6 million. VerticalNet had started out as Water Online, but by late 1997 it comprised nine vertical markets, most of them built around a formerly paper-based publishing operation. There are about 56 sites now in 12 different sectors, such as health, food, advanced technology and construction.

"The distinctness among them is pretty pure," says Walsh. "The word community is underused in B2B, overused in consumer." In other words, in online social communities people often communicate a lot, but they don't work together. There's a certain intensity that comes from collaborating, negotiating, buying and selling. Commitments are more powerful than gestures and postures; failure to deliver leaves many people in the lurch. If people are to be known by their actions rather than their words, there's a lot more action in these commercial communities than in your average chat room.

The customers tend to stay put in their own sectors, Walsh continues, but they may jump across markets within a sector. Suppliers, on the other hand, may work across sectors when they have horizontal goods, such as office supplies, or a broad range of goods, such as Walsh's former employer GE, which sells everything from plugs and fixtures in ECOnline (electrical contracting) to insurance in PropertyandCasualtyOnline. Or a piping vendor may offer different or even the same kinds of piping in different markets, says Walsh: "For our pollution site, it's corrosion-resistant; for food, it's plastic. For residential construction, it's easy to install."

Each VerticalNet site has auctions, chats, job postings, RFPs and RFQs, says Walsh. "The community looks for content as a validator. They may not read it, but they consider the site validated by the editor of a trade magazine they know. I was speaking at [the Wastewater Equipment Manufacturers Association] in Las Vegas," he recalls, "and I was talking with the editor of [VerticalNet's] Solid Waste Management. This stranger, a big solid-waste executive, runs up to us all excited, and goes, 'Paul Hersch! Paul Hersch, it's an honor to meet you! I've been a fan for 20 years!' These people are really important in their communities."

But they may or may not actually *read* the content, Walsh says. Instead, they tend to look for products, and the suppliers look for buyers. "A lot of purchasing is not about commodities, but deep information needs. Our job is to boil the brochures down. Hundreds of millions of dollars of transactions have occurred because of us. Fifty percent of the time, the buyers said they had never done business with that vendor before."

Of course, this means that someone else is losing a lot of business. Yes, indeed! says Walsh. "A lot of the big companies that are in denial are losing. It doesn't so much help little guys break in," he acknowledges, "but gives midsize companies a way to climb up the list during evaluation. It's a leveler for the mid-level guys and hurts the big guys...but it would hurt them even more not to be there. I say, 'Don't open your Trojan horse until you're inside the castle.' These guys are very suspicious of anything new. All communities are. We offered real transactions because people asked for it. Communities create trust. Trust creates relationships. Relationships create commerce.

"Sadly, the more close-knit a community, the more closed and change-resistant it is," Walsh continues. "Waste-water control, food processing...the pace of change there, the adoption of e-commerce is slower than in, say, photonics. A key element for some of these more established communities is the annual trade show; it's the biggest thing of the year, just like a high-school reunion. For example, I went to the show for powder and bulk solids management: 20,000 people, they all know each other. I have never seen such community except for Star Trek, but it also means cliques. They've got rustbucket trust: People want you to be just like your daddy was when he ran the company. Whereas with DRAMs, it's 'Hey, click here!'"

VerticalNet also gives Walsh interesting insights into the world economy. For starters, he notes, 40 percent of the traffic comes from outside the US. And each segment has its own profile: The Third-World economies tend to show up at the environmental sites: water, air, and the like. The developing economies focus on production and processing of manufactured goods, while the first world gravitates to the high-tech sites, such as MedicalDesignOnline or TestandMeasurementOnline.

## PANEL: NAVIGATING CYBERSPACE

*It's a big, big Net. According to a recent survey by Inktomi and the NEC Research Institute, the Web holds more than a billion unique documents on 5 million unique sites, not even counting the vast stores of information behind corporate firewalls and the huge databases that are now searchable online. The days when the NCSA "What's New" page announced almost every new Website are a distant memory. Today's search engines often return so many results that they barely help. And it's not just a matter of finding what you're looking for. How do you make sense of what you've found? How do you keep track of where you are and where you've been? How does the network keep track of who you are, so you don't have to keep introducing yourself over and over?*

*Cyberspace today is like a global highway system with on-ramps and off-ramps, but hardly any signs or maps. The Net's greatest strengths, its flexibility and extensibility, turn into liabilities when locating or managing resources becomes too difficult. Finding needles in the virtual haystack will only become harder. And though it's supposed to be an inter-network, the Net is filled with walled communities, inward-facing companies and proprietary data repositories that can barely communicate with one another. Seems like a large business opportunity here....*

*Some suggest attacking the Net's navigation challenges with metadata, giving structure to information through new protocols or, in Novell's case, tying everything together with directories. Others, such as Google, think organization can be inferred from implicit structures such as links between Web pages. (AltaVista finds 14,400 pages linking to Werbach.com, which sounds impressive until you discover there are 2.8 million linking to Yahoo.com and 5.4 million to Microsoft.com.) Can these techniques make cyberspace feel more ordered, more tangible, more like -- dare we say -- the physical world? Or is that the wrong goal?*

### Carl Malamud, chairman & ceo, Invisible Worlds -- Found in space

Carl Malamud brings an eclectic yet appropriate resumé to the task of mapping cyberspace. He has written eight books, including **Exploring the Internet**; has served as a technology consultant and columnist; and has been a visiting professor at the MIT Media Lab and Keio University in Japan. Not to mention founding the nonprofit Internet Multicasting Service, which among other things operated the first Internet radio station, put the Securities and Exchange Commission's EDGAR database online, organized the 1996 Internet World Exposition and created a digital Santa Claus that answered hundreds of thousands of Christmas e-mails from children around the world.

His new venture, Invisible Worlds, attacks one of the most fundamental challenges of Internet navigation. "The overall problem we're trying to solve is the issue of sending metadata around the Internet," Malamud says. Search engines, designed to make it easy to find things online, now often return so many results that they become useless (see **Release 1.0**, 1-99). Malamud sees that as a symptom of deeper problems. The missing link, he believes, is "a data-flow architecture for metadata" --

or information about information. (We discussed the basics of metadata in connection with content filtering in **Release 1.0**, 5-98.)

Take the EDGAR database, for example. With terabytes of corporate financial reporting documents available on the Web, EDGAR is what Malamud calls a "deep well" of information, incredibly valuable but incredibly hard to search. Yet what if EDGAR knew the difference between a 10-K and an S-1 form? Or knew that public companies have ticker symbols, which can be keyed to stock prices and other information? Instead of searching on a vast list of words, users could search on these more explicit structures, and use them to organize the results. That's exactly what Invisible Worlds has done in creating EDGARspace, now available in beta form on its Website (www.invisible.net).

Making it easier to search for EDGAR documents is only the tip of the iceberg, however. "What we think we've created is a way of creating spaces in which things have relationships to other things," says Malamud. Invisible Worlds brings serious intellectual artillery to the table. In addition to Malamud, the company's cto is well-known Internet technologist Marshall Rose, and its advisory board is a who's who of technical experts including Paul Vixie of the Internet Software Consortium, domain name system creator Paul Mockapetris and MIT professor David Clark.

At the heart of Invisible Worlds' approach is the Blocks protocol for distributed metadata, which it has submitted to the Internet Engineering Task Force. Blocks defines an XML-based architecture for transporting metadata across a network of "Space Servers," that keep track of where information is located, analogous to the domain name servers that handle Internet mnemonic addresses. Many new Internet applications these days are shoehorned into the hypertext transfer protocol (HTTP) to penetrate firewalls, but Malamud says he and Rose decided the inherent limitations of HTTP were too great for what they wanted to build.

Invisible Worlds has also created software modules called "mixers" that extract and map metadata from content sources, and "builders" that query Space Servers, evaluate the results, then publish the results to users. Because the information is coded in XML, it can be published in virtually any format the user desires -- flat text, spreadsheet cells, an Oracle database or a 3D map, for example. Developers and end users can script these transformations using Invisible Worlds' SpaceScript or other languages of their choice.

Invisible Worlds is developing expertise in the large-scale processes involved in transforming massive data stores such as EDGAR and patent and copyright filings using standardized metadata formats. (It currently operates 28 terabytes of disk space, expected to grow to 41 terabytes by mid-March.) Customers such as Reuters, which is also an investor, will pay Invisible Worlds to organize and host their data stores, and to make the information available for either internal or external use. On the destination side, Invisible Worlds is pursuing an open-source model, hoping to make its protocols ubiquitous and encouraging developers to build on them. It plans to generate revenues through premium versions, support and professional services.

## Larry Page, ceo & co-founder, Google -- Following the links

When we last met Google co-founders Larry Page and Sergey Brin, they had just left graduate school at Stanford to commercialize their next-generation search-engine technology (see **Release 1.0**, 1-99). By analyzing link structures between Web pages and employing other specialized algorithms, their project, known as Google, returned noticeably more relevant results than established search engines. In June Google received $25 million in venture funding led by Sequoia and Kleiner Perkins. With traffic doubling every quarter, the company now handles 11 million searches per day, half on its own site and half through partners such as Netscape, the *Washington Post*, Dogpile and Metacrawler.

Page sees metadata tagging as largely unnecessary, because automated approaches may soon achieve the same results more efficiently. “It’s a lot of work to structure all this information for people...to go and tag all the data,” he says. “I prefer to see people give us a year or two to do it automatically.” Page points to research Brin did while still at Stanford to extract book titles and authors from Web pages automatically. The results were excellent because redundancy among many pages listing the same authors and titles made these elements stand out.

Page calls this “using the data itself to infer the structure.” Combining such techniques with human-edited structures such as Netscape’s Open Directory Project should approximate the effectiveness of metadata with far less effort, he argues: “The Web is largely created by humans. Things that are interesting end up being a blend of human and software.”

Google has been doing real-world experiments on the effectiveness of automated mapping by returning targeted text-based advertisements with some of its search results. Ads on Google can generate clickthrough rates many times the industry average, because the company targets them more precisely. Queries about travel and about hotels both fall into the same general category, but an ad for airline tickets gets a much better response with the former, Page says.

Page believes the biggest impediments to continued enhancement in automated search and navigation tools lie not in technology, but in business models. He sees a disconnect between users’ cost-benefit calculus and the equivalent analysis on the service-provider side. Better results, which consume more hardware or processing resources, don’t necessarily generate more revenue. In response, some search engines index only a small part of the Web, or they scale back performance when they receive too many simultaneous queries. But even though better results don’t make more money for search engines, *worse* results impose a definite cost on users, because they have to spend more time looking for the right answer.

Once the business model issues are overcome, however, Page feels algorithms running over increasingly powerful hardware on an ever-growing store of data will support applications that simply weren’t possible before. With a critical mass of information, he says, it becomes possible to create the “ultimate search engine,” which understands context at a level that artificial intelligence has traditional striven for. And, he hastens to add, Google plans to be the company building it.

**Eric Schmidt, chairman & ceo, Novell -- Who are you?**

“We’re currently operating on a 1990’s model of the structure of the Internet,” argues Eric Schmidt. “It doesn’t scale well.” Nearly two years into his stint at Novell, the former Sun cto and Java evangelist sees fundamental challenges of Internet business architecture still unsolved...and he’s positioning Novell at the center of the solution.

At Novell, Schmidt inherited a company that had tried and failed to compete head-on with Microsoft in productivity applications through the acquisition of WordPerfect (later re-sold to Corel), and also a company that, with Netware, was the leading provider of proprietary network operating systems that the Internet was quickly making obsolete. Schmidt rapidly reoriented Novell toward IP-based networks, emphasizing its core expertise in directories. The company has positioned Novell Directory Services (NDS) as the foundation for a variety of directory-enabled networking applications ranging from security to personal data management.

Schmidt sees the set of issues around identity, security and policy management as the critical challenges to scaling the Internet going forward. “The interesting problems are not how we get the bandwidth provisioned, but what are the new services that are now enabled,” he says, arguing that once the foundations are in place the applications will emerge.

Issues related to identity are central because relationships drive the Net, and relationships depend on rich, consistent identities for individuals and communities. Instead of Metcalfe’s Law, that the value of a network increases with the square of the number of users, Schmidt postulates that the value of the Internet grows with the square of the number of relationships it encompasses. “If you don’t believe me, think eBay,” he says.

According to Schmidt, “coherently aggregated” communities will move the Internet from an undifferentiated data cloud to something more useful and comprehensible. In the physical world, locality corresponds to geography. Online, Schmidt says, the notion of locality will relate to the set of relationships and communities that a user is part of.

Will someone have to organize those communities, or will they emerge bottom-up? we ask. “All avenues will be tried,” he ventures, “and all of them will go public.” Schmidt emphasizes that he isn’t betting on any particular application becoming popular, and that for Novell it doesn’t matter: “I’m not forecasting any specific structure. I’m forecasting that the infrastructure will be very lucrative, because of the unimagined possibilities of full-service networking.”

Doesn’t this imply centralization of information? No, Schmidt says, acknowledging that centralized repositories aren’t the way society typically works. Instead of a central database for identity-related information, users will have wallets and proxies that allow them to manifest different identities in different situations. There will be many directories, but they will be able to talk to one another to allow security, policy management and other features to operate network-wide.

Schmidt draws an analogy to the banking system. Only a fraction of the assets deposited with banks exist in any physical sense; the rest takes the form of overlapping, securitized obligations. People trust banks with their money because they believe their account identities will remain intact and secure, even when they want to withdraw money from an ATM at another bank.

For computer networks to achieve this level of performance, they will have to span organizational and geographic boundaries, not just for the underlying data packets, but for applications as well. At that point, users will trust their data to the network rather than keeping it in local systems and devices, allowing ubiquitous access and a variety of powerful applications.

**THANK YOU!!!**

*We'd like to thank the following companies for contributing products and services to this year's Forum:*

**VA Linux Systems** for Web and e-mail access stations, **Terabeam** for high-speed Internet connectivity, **Xerox** for color printers and on-site signage, **3Com** for our wireless local-area network, **Research in Motion** and **Go America** for wireless e-mail devices, **Cybiko** for personal entertainment devices, **Snapfish** for online photo developing, **NewspaperDirect** for digitally printed local newspapers and **Lante** for integrating it all together into our Forum network.

And finally, a big round of applause for our EDventure Holdings staff!

## TUESDAY, MARCH 14

### MEDICINE WOMAN

**Marjorie Scardino, ceo, Pearson**

Marjorie Scardino is an outsider in so many ways -- a woman in a man's world, an American heading an old-line British communications company, a former lawyer who likes to keep things simple. She's the medicine people know they should take...and somehow she makes it palatable for them.

She came to Pearson after being ceo of The Economist Group, where she dramatically boosted circulation of its flagship magazine, and the profits and scope of the company itself. At Pearson, *The Economist*'s parent company, she has been making radical changes in this company despite its 25,000 people worldwide and market cap of $21.4 billion: substituting collegiality and company-wide e-mails for the former paternalistic culture; ending long-term ownership of companies like Lazard and The Tussaud's Group (Madame Tussaud's Wax Museum and theme parks); shelling out $4.7 billion for Simon & Schuster to create the world's largest education company; taking stakes in new-line companies such as Data Broadcasting, MarketWatch and The Industry Standard; and venturing with Telefonica, the former Spanish state telco now more famous as the parent of Terra, the largest Spanish language ISP.

Her goal with Pearson is "education in the broadest sense," and though there's some entertainment in that "broadest sense" (popular books, television), much of it is about the content equivalent of medicine rather than cake. In other words, it's good for you! But in a world where form routinely overtakes substance and expectations for production values are high, the customers often expect the medicine to taste like cake.

The medicine Pearson is doling out is in increasing demand. "The appetite for education in the developed and developing worlds is ravenous," says Scardino. "Governments and individuals see it as the path to self-determination, and they're willing to invest as much as they can in it." She muses: "Is education the obligation of government, or a proper pursuit for the private sector? Can we trust education to market forces -- let companies make money out of teaching our children to read? Can a for-profit company be as serious about its public trust to educate as about its commercial purpose to make money?"

And we might add: Will the greater involvement of individuals change how we pay for education? Will it produce innovative payment terms? The first global education bank? Are student loans the big investment medium of the future? Does all this mean that education becomes the province not of governments, but of transnational development organizations?

In many countries, of course, the future is so unpredictable that people hesitate to invest, in themselves or anything else -- hence flight capital. In the long run, people will need credible evidence of the value of a good education -- both financially and socially -- in order to be willing to take on the burden of debt for their own education. And the education Pearson and its competitors will offer will actually have to produce the desired results, enabling people to learn and become productive enough to pay back their debts.

Meanwhile, the Net is a powerful tool in education. “Technology should help put an end to the ‘one size fits all’ approach to education,” says Scardino. “All kinds of educational theories have tried it, and now each student can finally become an individual and learn at his own pace. How will local school boards react to that idea, when they want to set the curriculum and choose the books their children can read? And how will we judge results -- are there some things everyone should know?”

Pearson is using the Internet in business information, too. Its FT.com business site is one of Europe’s leaders in the non-entertainment sector. Its business sites in France and Spain lesechos.fr and recoletos.es, affiliated with leading local newspapers, also command leading places in their markets. (The *Financial Times* has also just launched FTDeutschland (ftd.de) in Germany.) As traffic to these sites rises, so does the circulation of the newspapers out of which they grew, notes Scardino. “I’m dubious about [the theory of] cannibalization, let alone the death of the newspaper. I think off-line and on-line can co-exist and even strengthen each other -- if you do it right.”

Doing it right is not just strategy; it’s execution every day with fresh opinion and analysis. Scardino says delicately, “There’s a danger that opinions are also converging as fast as the channel owners. We want to make sure to keep a distinct identity” -- the editorial page as medicine.

## PANEL: LIFE BEYOND THE SCREEN

*The greatest challenge for the virtual world, and those building it, will be transforming the real world. Many entrepreneurs are eager to make a difference beyond their companies, but unsure how to do so. Other beneficiaries of the New Economy feel unfairly criticized for not giving away more of their wealth. Certainly, philanthropy is a fair subject for discussion, even an essential one. Has the Internet boom really just been about the money, or do we mean it when we say we intend to change the way people live, communicate, learn, play and work? Because if those are the goals, there’s more to achieving them than successful IPOs.*

*When companies that lose hundreds of millions of dollars can still be seen as viable for-profit ventures, what makes a successful nonprofit endeavor? Surely some of the skills it takes to build companies must translate to the task of building a better society. The same technological tools that turn tiny startups into industry-dominating companies should also be able to help organizations, public and private, tackle issues that define the character of our neighborhoods, cities, countries and world.*

*Hiring lobbyists on policy issues and writing checks to worthy causes are relatively easy steps, but how effective are they? Just as in venture finance, money alone isn’t always enough, if it’s used inefficiently and support systems aren’t in place. And how self-serving can donors be -- from gifts of software at list price to sponsoring university research?*

## Zoë Baird, president, Markle Foundation -- The time is now

The Markle Foundation has funded nonprofits in the communications field for more than 30 years. But it attracted significant attention when it announced last July that it planned to invest $100 million, more than half of its total assets, on Internet and new media projects over the next three to five years. Zoë Baird, who took over as president of Markle in January 1998, believes there's no time to waste: "We feel a real sense of urgency on behalf of the public."

The next few years, Baird says, will be the critical time to shape an Internet that meets public needs. "It's going to be much harder to shape interactive media in the future than it is at this time, when business models are forming and public expectations are being set," she argues. Consolidation, stabilization of business models and proliferation of consumer devices such as interactive toys will all deepen the Internet's impact on society, while making its contours more difficult to change. Consequently, foundations and others concerned about the social impacts of cyberspace must learn to move in Internet time themselves, or they will miss the opportunity to have the greatest influence.

Baird encourages people to see philanthropy not as a means of giving something back, but as a way to build what it takes to achieve the goals we have for society. We're all here because of enthusiasm for the Internet, she notes. Why not work to ensure that interactive media reaches its full potential, in terms of creativity, vitality and positive social influence?

"The challenge for the companies that are driving the Internet is not just to reach for the low-hanging fruit," she explains, "but to have longer-term and larger visions of what they are trying to achieve." Entrepreneurs and business leaders should want to create something they will feel proud telling their children and grandchildren about, Baird says, which means thinking about the broader social impacts.

Markle's role in all this is multi-faceted. The foundation can help people and organizations see the potential in what they are already doing, can enable them to do more or can provide expertise and research to help them succeed. For example, Markle plans to support R&D to identify opportunities that the market might otherwise miss. Creating high-quality online content for children or corporate investment in low-income communities to close the "digital divide" may make good economic sense, but the research necessary to discover those opportunities would normally be seen as too speculative for profit-making businesses to fund. A nonprofit such as Markle can absorb those risks and catalyze socially beneficial investment, even though the end result is commercial activity. Baird says the foundation will partner with other nonprofits, academics and for-profit companies as needed to maximize its effectiveness.

The foundation targets four program areas: quality interactive media for children, information technology to improve healthcare, fostering public engagement through communications technology and enhancing the public voice in communications policy. (Disclosure: Markle has provided funding to the Internet Corporation for Assigned Names and Numbers, which Esther Dyson chairs.) Baird says the primary criteria for grantmaking is to identify activities with the most substantial impact for the objectives of each project. Last week, for example, Markle announced a major online and offline public information campaign with the Ad Council on how interactive media can best be used to benefit children.

“I think the thing that’s most needed is for people to appreciate the importance of thinking about this now,” Baird concludes. “[They should] think about what they would like to see this medium do for society, and how they can help make it happen.”

### Michael Bloomberg, ceo, Bloomberg -- The selfish pleasure of giving

Michael Bloomberg’s eponymous financial information and media company provides market-tracking terminals to over 140,000 financial professionals and encompasses TV, radio, publishing and Web outlets. As someone who has himself become wealthy building a technology-based business, he feels qualified to deliver a simple message to newly wealthy dot com entrepreneurs and investors: “These are people who would never have made a dime if it wasn’t for their schools or the opportunities that others have given them. They should take some of their wealth -- right now -- and help the organizations that helped them, rather than hold on to it.”

Bloomberg himself sits on the boards of 20 nonprofit organizations, in addition to his financial contributions to charitable causes. And in most of those cases he’s a member of the executive committee or otherwise devoting real time and energy to the cause. “I won’t join something if it’s just to lend my name,” he says. Bloomberg has a staff dedicated to these efforts that provides management and fundraising assistance to organizations he supports.

Last year, Bloomberg and his company contributed in one way or another to more than 500 nonprofits. Money is only part of the equation, he explains: “We are much more tempted to do something if we can involve our people in it, rather than just write a check. For example, we have a successful, growing volunteer program.” Bloomberg says he’s working to make philanthropy a permanent part of his company, so the commitment remains in effect even after he’s gone.

How does Bloomberg decide where to give? “You do those things you believe in,” he says, noting that the largest share of his personal philanthropy goes to his alma mater Johns Hopkins. “Then you do those things where your friends ask you do it. Then you do some things that are good for your company’s business.”

Bloomberg notes that a big part of New York City’s social community revolves around charitable causes, and says the shared commitment among most of his friends and business colleagues is an important motivating factor. “I wouldn’t be friendly with anyone who was not philanthropic, nor would anyone I know,” he states. The best way to encourage Internet millionaires to make a greater commitment to charitable causes, Bloomberg argues, would be for more of the most successful and respected among them to make personal appeals to their friends.

In the end, Bloomberg acknowledges, there’s a selfish pleasure in helping others. Some of that involves leaving a better world for his children, and doing something good with the money he's made. Some of it, though, is a recognition of the flip side of the prevalent culture of unfettered entrepreneurship. No one succeeds wholly on his or her own, he points out. And the argument that government should get out of the way whenever possible, including funding social-welfare programs, brings with it an obligation for private philanthropy to step in and fill the gaps.

### Dan Lynch, general partner, Lynch Enterprises -- We want your brains

Dan Lynch has had a long and successful career in the technology industry. He served as director of computing facilities at SRI International in the 1970s, and while at the USC Information Sciences Institute in the early 1980s he led the transition of Arpanet, the precursor of today's Internet, to the TCP/IP protocols. He subsequently founded the Interop networking trade shows, now owned by Ziff Davis, and online payments processor Cybercash. Today he's a private investor, having backed companies including Covad, Exodus, Infoseek, InfoSpace, MessageMedia, Polska Online, Placeware and Women.com (see page 5).

At 58, he's ready to devote more energy to his Napa Valley vineyard...and to philanthropy. Lynch sees a direct connection between his data networking experience and his charitable efforts. "What I'm learning, having been in this for a while, is the interconnectedness of things," he explains. "When you get into the 'giving community', they are all connected with each other. You step into a network."

Becoming an effective philanthropist isn't simple. Lynch says the mechanics -- from establishing family foundations to considering the tax implications of donating appreciated stock -- are something most entrepreneurs, even those committed to charitable giving, aren't prepared for. That's one reason he wants to share what he's learned with others.

Lynch thinks there's great potential for creativity in melding social betterment with the kind of market incentives entrepreneurs learned in the business world. One friend, he notes, set up two $50-million venture funds -- one for China and one for India -- to support entrepreneurs in those countries, seeking to jumpstart beneficial economic activity rather than to maximize return on investment.

Lynch says his personal philanthropy starts close to home. He is most interested in organizations tied to his local community, and in helping inner-city children. He also supports breast-cancer research; his sister died of breast cancer last year. One of Lynch's children, who is a cancer researcher, helps him evaluate organizations to contribute to.

Internet and software entrepreneurs have been criticized for not engaging in philanthropy commensurate with their new wealth, but Lynch believes the captains of the technology industry may ultimately leave more behind than their industrial-age predecessors. "I don't see us guys in high tech thinking about setting up family dynasties," he explains. "So the concept of giving it all away is much more readily apparent here." Given the number of new millionaires and billionaires riding the Internet boom, Lynch feels there's tremendous untapped philanthropic potential.

Summing up, Lynch issues a challenge to his colleagues: “We want more than your cash -- we want your brains. We want your brains while you still have them.” Technology entrepreneurs got to where they are by building organizations and meeting other people’s needs, he points out. Those same skills can help make the world a better place.

### Martin Varsavsky, chairman & founder, Jazztel -- Social entrepreneur

Though not yet 40, Martin Varsavsky has already started six companies, several of which now have multi-billion dollar valuations. And he’s now bringing that same entrepreneurial drive and creativity to a series of charitable and public-interest efforts. When Varsavsky was 17, his family was forced to leave his native Argentina following a military coup. They moved to the United States, where he started his first company, Urban Capital, to renovate old loft apartments. (He still owns it.)

Following a number of other entrepreneurial ventures, he moved to Madrid in 1995. He founded Viatel, which built the first independent pan-Europe telecommunications backbone network, and then in 1998 started his current company, Jazztel. Jazztel is a competitive local-exchange carrier focused on the Spanish market, which also owns a Spanish-language Internet content business, ya.com. And for good measure, Varsavsky also founded a broadband ASP in Germany, EinsteiNet, with a network designed to facilitate distributed Web-based applications.

Varsavsky sees strong parallels between his business experience and his charitable efforts. “I’ve used my time to build companies, and now I’m thinking of using my time do things that have an impact on society,” he says. He muses that the fact that he has three nationalities -- Argentine, American and Spanish -- may give him more of a global view in both his business and philanthropic efforts. In Europe, he says, many people feel that the government already collects enough through high taxes, and therefore are less willing to contribute to private charitable causes.

One important aspect of private philanthropy, Varsavsky says, is that it allows for a plurality of ideas. Whereas government programs tend to concentrate on a limited set of goals, private activities have more diverse objectives and approaches.

Varsavsky’s first major philanthropic effort is a novel program to help put students and universities in Argentina online. Only 200,000 out of 10 million college-age people in Argentina have Internet access today, but the government doesn’t have the resources to wire all the schools and universities itself.

Under Varsavsky’s plan, the government will auction the right to e-commerce and advertising revenues from a nationwide student portal. The catch is that the schools themselves will still control all the content, and the winning bidder will be the company that offers to connect the most schools and universities in the shortest time. “It’s not charity, but it serves a purpose,” Varsavsky says. He’s putting together an independent board for the effort, and rounding up major Latin American or Spanish-language Internet companies to bid (though Jazztel itself will stay out to avoid a conflict of interest).

Varsavsky has also launched several Internet-related charitable efforts in Spain. “I’m focusing on getting both the very young and the very old on the Web,” he explains, “because I believe being on the Web is being in the world.” For example, Varsavsky established a foundation in Spain to help senior citizens take advantage of the Internet, after seeing his own older relatives take advantage of the Net to communicate.

The ultimate reason to give money away, Varsavsky argues, is that we’re all going to die, and we can’t take the money with us. “I want my children to have enough money to do something,” he observes wryly. “But not enough to do nothing.”

## MICROSOFT AND REALITY

### Steve Ballmer, president & ceo, Microsoft

*(Steve Ballmer had family obligations and was not available to talk with us during the week we were preparing this documentation.)*

Formerly business manager for the *Harvard Crimson* (and with stints at Procter & Gamble and Stanford B-School before joining Microsoft in 1980), Steve Ballmer came into his own this year as he assumed the chief executive role from his long-time friend and partner, Bill Gates.

This may well be a healthy move for the company, separating it slowly from the personality of its founder even as its future structure remains uncertain. (Most observers believe the company would be worth more if it were split -- but that’s only a financial assessment. Other views talk about the value of a unified software platform. We’d argue that a unified platform is valuable in the short run, but that entirely new platforms, while sub-optimal in the short term, end up fostering progress in the long term. And Larry Lessig (page 31) would argue that modularity is valuable at any time....)

Whatever happens, Ballmer is the essence of Microsoft’s business side. Though outwardly more emotional and outgoing than Bill Gates, he’s also a more practical business personality -- comfortable with the randomness of business and government even if they don’t make sense. For Bill, randomness is offensive; for Steve, it’s reality.

Ballmer will now be leading the company into a reality of new systems architecture, and probably some unknowable corporate architecture. Both platforms and business models are changing. Windows needs to complement different OSes (from Microsoft and other vendors) on non-PC devices and the Internet; Microsoft has been exploring various forms of software subscriptions and service streams as well as traditional licenses.

Of course, the company has huge advantages: the default installed base on the desktop and a good share of the server market, relationships with everyone in the business (including most recently Sun Microsystems!), compelling economies of scale, 32,000 employees, a $4-billion research budget at a time when most companies are buying research with overpriced stock, and more cash ($18 billion) than most Internet companies’ market caps. How does Ballmer plan to leverage these strengths?

## PANEL: GETTING PHYSICAL

*We have spent much of the last few decades constructing a parallel, virtual world in cyberspace. Now we're tying the physical and the virtual together, without humans as intermediaries. Computers are becoming conscious of their environments; applications are becoming location-aware; we're using data-mining not just with commercial data but to better model physical phenomena -- everything from crowd movements (Legion Crowd Dynamics) to automobile defects (Spotfire). Mobile users want different kinds of data from sitting ones; how about a service that gives you offline prices as you drive from store to store, or that lets you pay for items from a vending machine through your cell phone bill?*

*In the other direction, the tools of the Net allow us to apply the equivalent of mass-production quality control and process monitoring outside of production lines and on a one-off basis. Someone can monitor all the flights all the time, and MyAlert.com can tell you that yours is late. A service such as Payusback.com (not on the panel) can monitor all your packages and collect refunds from FedEx for those that are late. Gateway can sell to you in a showroom with a human to hold your hand and look you in the eye, but it can also cost-effectively get a computer custom-configured and delivered to you at home.*

*Finally, is the United States so wired that it has forgotten the physical world? Or why are three out of our four panelists from outside the US, and the last one from outside Silicon Valley?*

### Christopher Ahlberg, ceo, Spotfire -- Aha! or oh no!

Christopher Ahlberg first got his exposure to rich data at Ben Shneiderman's Human-Computer Interaction Lab at the University of Maryland and later did his PhD at Chalmers University of Technology in Sweden. "I saw an opportunity emerging out of desktop computers in the early 90s," he says. "They started to have pretty strong graphics capabilities -- and we could do some pretty cool things for accessing/interacting/analyzing/exploring large databases with only graphical input/output -- no keyboard, no text."

But instead of data-mining customer records or financial files, he worked with real-world, rich data -- first environmental data ("That is still a really cool application," says Ahlberg), and then film databases for Microsoft on a video-on-demand project, chemical data, and so on.

This was the genesis of Spotfire, the company Ahlberg founded in 1996 with money from Staffan Ingeborn at InnovationsKapital, one of Sweden's leading VCs. Most business data is fairly abstract: financials, payroll, customer data and of course inventory counts. But there's amazingly little data about what the companies actually produce -- the features of the products themselves. That was Spotfire's field. The company started generically but quickly realized that focus made more sense, and it followed the lead of its first few customers, who happened to be pharmaceutical companies such as Merck, Pfizer, GlaxoSmithKline and AstraZeneca.

"The best experience has always been to work with domain experts who are not great at software but know their domain real well," Ahlberg says. "Through our technology we can help them push their thinking orders of magnitude forward in terms of sizes/scales of problems they can address. I love to do a demo where I ask people how many different variables they can handle at the same time...if you have good enough visualization you can get up to about 16 comfortably." (You'll get a chance to see this at the Forum.) The variables might include manufacturer, date of manufacture, size, failure rate and the like.

"We love to watch the reaction when someone sees something in his data for the first time. Sometimes it's 'aha!' Sometimes, it's 'oh shit!' But either way, it's new knowledge that was just waiting to be seen," says Ahlberg. The best way to foster it is to work closely with a customer and help him figure out which variables to explore, what units of measurement to use, what to look for. For pharmaceuticals, for example, Spotfire helps them to study drug-trial information, to understand it, to detect dangerous project paths (i.e. ineffective or harmful drugs), and to present results to regulatory agencies.

Now firmly established, the company has widened its reach beyond pharmaceuticals. For example, for a large auto-maker it recently examined warranty data. It turned out that the car-maker's upscale sedan had a lot of problems with just three electrical components. All of the problem ones came from just a few suppliers, who have now fixed their problems.

Other customers include Unilever, Procter & Gamble, and chemical companies DuPont, Rohm & Haas, Dow and Union Carbide. Even within such large clients, Ahlberg notes, "The Web has allowed us to deploy our discovery technology into the hands of large sets of people. That sounds like marketing, but I want to make a point about the Web: You can make many, many people part of a discovery process. It's not only about making five people smart; it's about making 2000 people smart and making them smart with a common language for discovery."

The company moved its HQ from Goteborg to Cambridge, MA, in 1997. It has received $9 million in funding from Atlas Venture and the Sprout Group, and is heading towards an IPO.

### Patrick Connor, ceo, Legion Crowd Dynamics -- Traffic tracker

Of course, people are physical things too, even though they have minds of their own. That makes predicting their movements an interesting combination of science, behavioral data and psychology, all reducible to algorithms that can predict movements of crowds fleeing a stadium in a fire or hungry shoppers passing a Dunkin' Donuts on an airport concourse. Legion Crowd Dynamics specializes in precisely such modeling, using systems developed by a team of patent-winning ex-NATO scientists based in Britain and Monaco. Its customers include the Hong Kong Jockey Club (operator of two race tracks that produce $12 billion annually, founded in 1884), the Sydney Olympics, Britain's Railtrack PLC, Britain's Historic Royal Palaces and the planners of Britain's new Wembley Stadium.

The company sees its primary target market as the developers and operators of all public buildings and people environments, mostly reachable through a “SuperClub” of architects and other consultants. Insurance companies are also prime candidates: Ideally, they’d like to get involved before something is built, rather than simply calculate the risks of overcrowding afterwards.

The basic idea is that before you design a public space it’s helpful to know what people will do in it. How fast can a stadium empty if some disaster occurs? At what capacity will people pile up at the exits, trampling each other and making the disaster worse. (It’s easy to enlarge or add exits in advance; tougher later.) Similarly, an airport wants to know how crowds (and planes) will move. Where should the retail space be? Where will the bottlenecks occur?

“For the Hong Kong Jockey Club, Legion’s analysis helped the Club to redesign its facility to improve traffic flow, capacity and safety -- in short, its economic viability,” says Legion co-founder and ceo Patrick Connor. “For the Sydney Olympics, it caused a fundamental redesign of the Olympic park to improve people flow, averting what looked like some major foot-traffic problems.”

Right now the company can pretty much charge what it wants: what’s a million or two (in any currency) compared to the millions or billions of many public works? And as a 20-person startup, it couldn’t handle more than a few projects at a time right now anyway. But its challenge will be to manage carefully the simultaneous processes of reducing its prices to reach a broader market, training its cadre of partners, and effectively serving that broader market even as competitors show up with (likely) less powerful but similar-sounding products.

However, says Connor, “They will have to rediscover the same science. There are scientific milestones we’ve crossed -- Eurekas about people’s behavior. We’re building these people environments bottom-up. We give the humans that we simulate the kind of intelligence and instincts that real people in real environments have. There are innate patterns, such as how people walk, and then variances across cultures and situations that we know about. For example, Chinese and Brits react differently when it rains; in Hong Kong, it’s a bunfight to run for cover. In England, people are used to it and just get wet, or walk slightly quicker. People in Hong Kong tend to shuffle; Scotsmen stride. Older people walk more slowly than young ones. The profile of a Cliff Richard concert would have a different age range, say, from a Chelsea football match.”

He continues: “We start out with [virtual] people who have an intended goal and an intended speed in free space, and then we model their actual behavior according to all these factors and the crowd density. In theory, if you know someone’s speed in free space you can easily compute what distance they’ll cover, but when different people are moving in different ways in different directions, especially in high-density crowds, it becomes uncomputable using traditional linear methods.”

The company will operate primarily as an ASP: It considers its technology too valuable to let out of its own backrooms. That also solves the problem of how to generate recurring revenues over time from a product that has great value but to a limited market; it’s never going to have as many users as, say, an accounting package.

Nonetheless, the market should be broader than it appears at first -- if Connor does his job well. Traffic movements apply to everything from the layout of a retail mall to air traffic control: Patrick, meet Vern Raburn (page 29)!

After Eton College, Connor started his first business venture in publishing -- an upmarket London services guide -- before attending Cambridge University. He later participated in Sir Richard Needham's successful 1992 campaign for the position of MP, which led to his becoming Britain's Minister of Trade and Industry -- a significant Tory victory.

Connor spent three years in Asia working with the international management team of Jardine Matheson & Co. Initially based in Hong Kong, he had senior responsibility for business development and for developing the group's interests in India and China. The company was formed in 1997 by Connor and his family, initially as an interesting software project with a team of patent-winning scientists from NATO. Connor joined full-time in 1998 to take the project commercial. Investors include the Connor family and about 30 private and institutional investors.

### Jorge Mata, ceo & founder, MyAlert.com -- Instant gratification

We had just arrived in Madrid for a cocktail party after a long day in Stockholm -- a board meeting and a speech followed by a long flight. And the night before we had spent in a plane from New York to Stockholm. So when Jorge Mata offered to do a demo, our heart sank. You know the drill: Find a quiet place, a power source, open up the laptop and power up.... The whole thing takes half an hour, and can put you to sleep when you're awake, let alone when you're about to keel over.

But before we could even get through feeling that dismay, Mata had pulled a cell phone out of his pocket and was well into the demo. "You want to know who's winning the Grand Prix?" he asked, misreading our interests entirely but never mind. It turned out to be someone we had never heard of, but Mata was already buying us a T-shirt with the driver's name on it. A couple of clicks, and that was it. Then we went on to more familiar territory -- high-tech stock prices. Online trading isn't available quite yet, but just wait!

That demo illustrates the compelling nature of wireless apps, and the reason that Europe's Net use -- and e-commerce in particular -- is likely to explode this year. Wireless is so much easier to use, it's local, it's ubiquitous...and millions of people are already comfortable with the device. In Spain, for example, 2 million people got cell phones last (Christmas) quarter, for a total base of 16 million; that compares with 10 million PCs and about 3.5 million Net users.

Mata himself got started as a telecom engineer for AT&T Bell Labs, and then ran McKinsey's multimedia and telecom consultancy in Madrid. From there he moved to manage an Internet banking project at Banco Santander, Spain's most innovative bank on the Net.

Most recently, he was vp of services in Europe for BroadVision. But, he says, "I thought personalization should go one step beyond [BroadVision's PC/Website tools] to the most popular device in Europe, the cell phone.

We created MyAlert.com in May 1999 -- with [1994 Forum speaker] BroadVision founder Pehong Chen as an angel investor. The idea was to push the wireless and the personalization. It's all developed on BroadVision technology, linked to SMS [short message service] and ready to be used on WAP [wireless access protocol] and more. Anything that works with e-commerce you should be able to do on wireless."

What's exciting, he notes, is that all the wireless networks know where you are; they are not using GPS, but rather triangulating position within 300 meters. Applications include everything from local restaurant and entertainment suggestions, to traffic advice or notifications that you'd better leave for your airplane because it leaves in 90 minutes and you are 45 minutes away. (Alternatively and perhaps more likely, it can tell you to relax if your flight is running late.) You can get an alert that your favorite singer will be in town and you can buy the ticket online, or you can get an alert that the CD you were looking for is available at a price that might interest you...from Boxman, no doubt!

This all sounds exciting, of course, but it raises some interesting questions (in addition to privacy, page 39). First of all, e-commerce and transactions aren't all there is to the Internet. Wireless access leaves something lacking -- namely, rich data. The kinds of navigation/visualization tools Kevin describes (page 11) elsewhere can't do their stuff; users are likely to get a single limited answer to any query rather than a sense of all the possibilities.

Will wireless reduce the richness of the Net and turn it into a sterile place where only transactions, actions and alerts count? Are the pundits right, that the Net limits the richness of communication and turns us into a series of transactions rather than subtly textured human beings? Probably that's a tendency, and one that people will fight the way they always do -- by using other, richer media as well, and by using their cell phones for realtime voice-to-voice conversations even as they are driving, walking or riding towards those rich, nuanced physical encounters with other people that they have arranged by SMS.

But wireless poses another social/political issue in Europe: Just as cable operators in the US may have undue control over Internet access for many millions of customers, so do the wireless operators in Europe threaten to limit people's access to any but their own services. Imagine Minitel in the hands of private business...

As for MyAlert.com, it is trying to maintain its independence. "We are connected to all the mobile operators we can make deals with," says Mata. "We're already in Spain, France, Germany and Italy. We are working with all the local telcos." And what about Vodafone? They might be a good partner, he allows, and leaves it at that.

## Ted Waitt, chairman & co-founder, Gateway -- Gateway into the real world

Gateway started in 1985, and like its rival Dell Computer, it had a Net business model before there was a Net: It was a virtual company that sold to people one-to-one through phone and fax and catalogues. And by the end of the 80s it also had its own BBS; "that was a huge way to communicate with customers," says founder Ted Waitt. In the mid-90s, the company also sold the first PC through the Net, beating the more business-focused Dell, Waitt asserts. As a virtual company, it had quite an image -- the spotted cows from the Midwest -- but it was not a company you could touch or feel. Waitt -- who learned the PC business by working in a computer store after dropping out of college, took the company to almost $4 billion by 1995, and then did something crazy.

He started opening computer stores, even as other companies were trying to figure out how to bypass the retail channel. Of course, Gateway's distinction was that these were its own stores; they were just another way to go direct to customers, rather than a channel selling a range of competing products. Despite the market's nascent fascination with the Net at the time, Waitt recalls, "It was what the customers wanted. Well over half the customers were still buying at retail. The Net can't replace human contact; you can't look a Web page in the eye. Stores let the customer get a better feel for the company; they're more involving."

Since that insight, Waitt has seen the benefits of a physical presence. "There's great synergy between phone, online and [face-to-face] retail," he says. "It's clear that having a local presence helps sales; it gets people over the hump. When we put a store in a town, the phone and Web business goes up noticeably."

In fact, Gateway's locations aren't really stores; they're showrooms. Customers can come in and try out the equipment, but when they order they get a custom-configured product delivered the (new) old-fashioned way: by delivery service direct from the factory. But the showrooms are designed to encourage people and to sell. Customers, many of them first-time buyers, can try things out.

"They're all working and hooked up to the Net with broadband access," says Waitt. "We don't lock people out of the machines. They can take training [generally for a fee]; they can see how the things look and feel. They can buy a training contract and then come to any class at any time. We're planning a training session where we help them build their own home page. Then they'll be able to go home and set up their computer and there will be their page when they connect for the first time. And of course, they can bring their machines in for friendly service rather than pack them off to some remote service center, and can buy accessories or peripherals while they wait."

Interestingly, says Waitt, "The closer we are to another computer store, say CompUSA and Best Buy, the better we do. We joke about having a spotted van outside their door running a shuttle bus to Gateway. People will drive to get a PC; it's not an impulse buy. Typically, we'll get a corner location in a regional strip center. The showrooms are only 5,000 to 10,000 square feet."

Gateway also wants to connect more broadly. “We’re trying to connect somehow with the real world,” says Waitt. “We don’t live in a purely virtual world. We listen to customers and put in place what they want. We leverage the Net for what it’s good at, but we’re not obsessed with it. We’re still a physical company with the cow spots. The stores are an anchor for us in the communities we’re in. While other companies spend fortunes on advertising, Gateway ‘guardians’ do outreach programs in all the communities we’re in. For example, they might go to a senior citizens’ center and give a clinic, and perhaps leave a PC behind.”

And speaking of physical, the company has moved its headquarters from South Dakota to San Diego in search of management talent.

In a way, Gateway’s growth as a virtual company gave it the critical mass to go physical, with more than 200 showrooms in the US. What better way to connect with the real world? And what better model for lots of other manufacturers trying to figure out how to connect with people directly? As Gateway shows, the goal should be not to close down the physical presence, but to use it for physical contact, while using the Net as one more two-way communication channel.

## READY FOR TAKE-OFF!

### Vern Raburn, president & ceo, Eclipse Aviation

We first met Vern Raburn at the second Comdex, in Atlantic City, introduced by Compaq chairman Ben Rosen back in the early 80s when Raburn was one of Microsoft’s first employees. Of all the people in the PC software business, he perhaps exemplifies it most broadly, having worked at most of the industry’s leading companies (Microsoft, Lotus, Symantec) and some of its most ambitious failures (notably Slate, which lacked the platform that the Palm Pilot was later to provide). He also worked for a while with Paul Allen.

But unlike many of the industry’s leaders, he also has a private life -- not just his wife, Dottie Hall, whom he met in 1977 at a computer show in Philadelphia, but also his beloved airplane, Connie (for Constellation 749A), whom he met in 1987. But he was flying long before that -- from the age of 12, in fact. His father worked for Douglas Aircraft, both on aircraft and on GPS and communications satellites. So aviation is not a passing fancy for Raburn; it has simply taken him a while to integrate the two facets of his life.

Now Raburn and his new company, Eclipse, are about to do to mass-market flying what the PC did to mainframe computing: make it available to individuals on their own terms. The idea is not for people to fly their own planes through the sky -- which strikes us as scary rather than empowering -- but for individuals to be able to order a flight on demand: an AirLimo. (Raburn points out that after World War II, the US had almost a million military-trained pilots. On the other hand, he’s honest enough to add that the training process was brutal: According to legend, four times more men died in aviation training than in air combat.)

Failing a million pilots, Eclipse needs to achieve two important things: planes 10 times cheaper than today's to operate (including capital costs), and a dispatch/allocation/routing facility flexible and powerful enough to manage the system cost-effectively. As a true air buff, Raburn is now concentrating more on the first, but as an old software hand he understands the difficulties and potential of the second.

Imagine a giant taxi-dispatch service for the sky, but one that would actually speak English (or your preferred language), show up as promised, and get you much closer to where you're going than today's mass-market flights. One objection often raised is that doubling or tripling the number of aircraft, let alone multiplying it by 10 or 100, would overwhelm the air-traffic control system, but Raburn points out that airspace is 3D. "There's lots of room for us under and over current flight patterns," he says. "All we have is a last-mile problem, trying to get them all down on just a few runways." However, he also anticipates an explosion in the use of secondary airports. Just as the car slowly changed living patterns, so could personal aviation.

Now what kind of pricing are we talking about? Raburn launches into an interesting disquisition on flying costs: Commercial airlines, with debt-laden balance sheets and heavy utilization of aircraft (up to 6000 hours a year), focus mostly on operating costs, while private operators and owners, who may fly only a few hundred hours a year, care much more about purchase prices. Eclipse plans to improve both, with a target price of $775,00 per airplane, lower than any other jet, and operating costs close to 50 cents a mile, or less than twice what a ground-bound limousine costs. With up to five passengers, it makes practical sense even for someone whose time is not worth thousands of dollars per hour.

We talked to Raburn while he was doing pre-launch press interviews, and he was delighted with the excited response. "People in the general press hear about empowerment with PCs but they still feel it's abstract. They *understand* flying," he says. On the other hand, "At *Fast Company*, for example, they expect everything to happen in three months. You can't get FAA certification in ten weeks, and you can't make an airplane overnight. You've got to build it and test it; you have to fine-tune the processes. There's an interesting tension between these two worlds. We want to take all the power of electronics and digital communications, and be disruptive in the physical world."

WEDNESDAY, MARCH 15

## THE LAW IN CODE, THE CODE IN LAW

**Larry Lessig, Berkman Professor, Harvard Law School**

“The original architecture of the Net gave great freedom to perfect competition,” says Larry Lessig, best known as the lawyer/scholar Microsoft barred from serving as special master in the 1997 consent-decree case. (However, at the request of Judge Jackson, he has submitted an amicus curiae brief in the current antitrust case.) “But we’re seeing an erosion of that freedom now. There are disturbing changes in architecture: deviations from the principle of end-to-end. In both cable and wireless, the carriers can select what services to carry. The consequence is to increase opportunities for ‘strategic behavior,’ behavior pursued not for competitive or efficiency reasons, but to exclude competition. Companies are blocking competition or favoring certain allies...it’s the sort of thing MS is alleged to have done, defending and extending legacy monopolies. It gives companies the power to do something they couldn’t otherwise do in the market.”

So what *should* happen? For one, says Lessig (declining to comment further on Microsoft), “Bill Kennard and the FCC should make it absolutely clear that the end-to-end principle is sacred, so you don’t have people like AT&T coming along whining that they expected to benefit from their investments and they need special privileges to exclude unaffiliated content providers. And then there’s the whole issue of patents and IP -- the explosion in business-process patents. There are changes that seem to benefit [only] some businesses, and that harm the competitive environment and chill innovation. In order to engage in certain normal business processes, you need to go hire a bunch of lawyers. There’s a cost there; do we get an offsetting incentive or economic benefit? Maybe the patent office should consider the consequences and issue a regulatory impact statement about its policies.”

Lessig, however, considers himself a libertarian. Indeed, people sometimes find him hard to pin down, since he argues from principles, not from a particular side. Both sides of the current MS-DOJ case have used arguments from his amicus curiae brief to bolster their case. Microsoft for one likes his argument that if a 1998 court of appeals decision applies to this case, then the government has not made an effective “tying claim” against Microsoft in its present litigation.

But overall, he favors the open-source, modular approach to software development, which makes it impossible for any single player to control a whole platform: The openness is both in interfaces, and in visibility that lets anyone hook up or plug in complementary or competing modules. And while he believes that the antitrust laws do not compel a company to adopt the open-source approach, he has argued that there would be fewer antitrust problems if more companies did.

Though he is focusing on “open-source values” currently, his most famous phrase is “the law is in the code”: Architecture determines not just software structure but also industry structure. He clarifies that perfect competition doesn't mean an absence of rules; it means *fair* rules, effectively enforced, to maintain competition. "The thing that frustrates me is that people are extraordinarily laissez-faire, but then they take no responsibility for bad outcomes -- as if declining to set rules absolved one of involvement. We live in this world; we *are* responsible. We have to make collective judgments on issues that affect us all, even though government has been really bad at that. I want some way to foster and implement collective judgment without necessarily going all the way to government regulation."

Formally, Lessig is Berkman Professor for Entrepreneurial Studies at Harvard Law School, but he is spending this year teaching at the Wissenschaftskolleg zu Berlin and, he says, "hiding" from all the hullabaloo in the US about Microsoft and other controversies. He first got intrigued with the intersection of economic and political structures "roaming through Eastern Europe in the 80s and watching them struggle with their new constitutions. Then when cyberspace came along, I saw a lot of the same issues...but people were less willing to take responsibility for this new world [they are implicitly designing]. It's all about rules and accountability; only *then* can personal and economic freedom produce good results."

## PANEL: MARKET AND ORGANIZATION STRUCTURES

*One side says the Net makes companies larger, the other side says it makes them small. It may be that the impact depends on the kind of company. Outsourcing and technology companies benefit from economies of scale; the Net means that they can pass on those benefits as ASPs and in other ways, allowing people/creativity-intensive companies to stay small without suffering from the disadvantages of being small.*

*How disruptive will these trends be, and where do they leave mid-size companies? At least, with the help of Offroad Capital, they should be able to raise equity from private sources. Jeff Gates, by contrast, would rather see them owned and funded by employees or customers than disconnected investors.*

*Clearly, the Internet is shaking up capital markets in a variety of ways. Who is setting prices? Offroad's Steve Pelletier thinks it's the individuals, newly empowered; Morgan Stanley's Mary Meeker thinks it's still the institutions she serves. Everyone agrees the capital markets should become more efficient and are in fact becoming so. Will that lead to a shortage of people, who are less fungible, and who don't necessarily grow in number and quality in response to demand? Or does it mean, as Gates hopes, that both as workers and as consumers they'll gain more power -- not just financially, but in terms of how businesses actually operate?*

*Finally, what's the role of regulation in all this? If you create competing marketplaces, they can compete on a variety of measures, including their rules. Does this mean that government regulation is less necessary, since the market with the best rules will win, and no one will go to the markets where people routinely get fleeced? How will these private "regulators" interact with public regulators such as the US Securities & Exchange Commission?*

## Jeff Gates, president, Shared Capitalism Institute -- If you can’t beat the capitalists, join ’em!

Jeff Gates, a self-styled populist who wants to see company ownership shared more broadly, finds an odd common cause with most of today’s young rich: They got their wealth as employees, not as investors. However, as far as he’s concerned, that’s still far too thin a slice of capitalists in a capitalist economy. His goal is to make *everyone* into owners -- workers, consumers, even food-stamp users.

Son of a business school dean at the University of Georgia, Gates got his training at the University of Virginia and at Hastings Law School and then spent much of the next decade hanging around with the Northern California human-potential movement (while others were starting semiconductor companies in Silicon Valley). He spent some time as in-house counsel to a large employee benefits consulting firm (Hewitt Associates) and then moved to Washington, where he helped shape federal legislation fostering employee stock ownership plans as counsel to the Senate Finance Committee (1980-87). Next he joined former Senator Russell Long (D-LA), Huey Long’s son, in a private lobbying firm. After a stint on Wall Street working with leveraged buy-outs, he returned to law practice in Washington in 1990 and formed the Shared Capitalism Institute in 1998 to promote his goals for broad ownership.

Gates’ ideas work in two directions: Simply putting more ownership and wealth in the hands of the people arguably responsible for it is only the start. He would also change the governance of corporations, from faceless committees and bureaucracies “responding largely to remote Wall Street values, to include an ‘up-close ownership’ component that is more human-sized, peoplized and localized.”

You could assert that the market is now doing that all by itself: Bill Gates is Microsoft; Jeff Bezos is Amazon; everyone has read about Silicon Valley’s beer busts and its liberal rules on pets, dress, and everything else. But in most companies there’s only *one* personality that rules, rather than company cultures that also take into account concerns unique to people and the communities in which they live -- a point made eloquently by Chris Locke in last month’s **Release 1.0**. Also, fiscally conservative Gates cautions, “With 76 million baby boomers barreling toward retirement with votes and very little capital, we’d best view every economic transaction as an opportunity to make people more economically self-sufficient.”

For instance, he asks that we consider: “What if each time you approached a cashier you knew that your purchases might gain you another few small slivers of stock depending on which company’s products you choose? And depending on which store you choose to patronize? With today’s information technology, equity purchases could be embedded in product purchases. Visa now clears more credit-card transactions in a week than the Federal Reserve clears checks in a year. It’s no longer a question of technology but of organizational and institutional reform. In a nation of consumers, not savers, households should become capitalized through their consumption expenditures.”

He finishes up with a flight of fancy: “Imagine how your interaction with cashiers might change, with their role now expanded, upgraded and dignified to become investment counselors: ‘Did you consider brand X? They have a new customer-equity offering this week.’” Online purchases could just as equally create equity, perhaps with a cut each from the portal, the retail site, the manufacturer.... Imagine a DoubleClick-style e-commerce syndicator working on behalf of consumers.

Perhaps more practically, how can you change the balance of power towards workers as *individuals* rather than as, say, demographic segments or mere counter-bureaucracies such as unions? Gates acknowledges that ownership may not change everything.

Besides, he insists, it’s not as much about power as it is about culture. “Employee surveys suggest that sort of boardroom power-sharing is of very little interest to most employees. They want capital accumulation and a voice in matters that directly concern them: bringing their dog to work, workplace design, wearing jeans, etc. Happily, ‘insider’ ownership tends to change executive and board behavior -- but usually indirectly, not because boards now have employee constituents or rowdy workforces rattling their proxies. Properly implemented, an ownership culture also evokes more broad-based leadership within firms, particularly as peer pressure discourages the dysfunctional behavior so common elsewhere.” (We’d call that the impact of a power shift, but never mind!)

In addition to ownership, he acknowledges, “We need education. We’ve educated people to be workers, not owners. We thought you connected people economically through jobs alone, but that isn’t robust enough.”

Instead of educating people before they become owners, which he concedes may be impossible, “Use ownership to lure people into becoming economically literate.” Once someone owns shares in a company, he has an incentive to know what the company does, and how business works in general. Surveys used to show that the average person thought companies make about 25 percent of revenues in after-tax profit; most likely, Schwab’s and e-Trade’s and Offroad’s customers know the truth, which is closer to 5 or 10 percent in a good year.

But there’s more to it than money, Gates continues: “Options aren’t ownership. They’re a bet on the market, nothing more. No vote. No dividend. No basis in the stock. No transfer rights. No liquidation right. Often even no information rights. They’re simply an upside ride, assuming there is one. And they play directly into today’s finance-obsessive myopia that is undermining sustainability across an array of nested domains: fiscal, social, cultural, political and environmental. And that leaves out the obvious issue of who, really, gets them. For the most part, they’ve become a way for top managers to skim market value.”

**Mary Meeker, managing director, Morgan Stanley Dean Witter -- A 10-bagger**

As the leading Internet analyst for Morgan Stanley, one of the leading Internet investment banks, Meeker combines the Establishment with the New Economy. As an analyst, she can claim ten "10-bagger" stocks -- stocks that rose 10 times (not 10 percent!) following her recommendations. And in some ways, her own life is a 10-bagger: She's 10 times busier now than she was as a technology analyst 10 years ago at Salomon Brothers.

Will the market consolidate? we ask. "It's inevitable. In the Net market-maker space: There are 600 now, there will be 3000 in a couple of years...and will it end up as 20? In the evolution of new business there is a lot of enthusiasm to start; then you always have consolidation -- in autos, PCs, portals, e-commerce."

She goes on: "The extremely high valuations for public companies can give them a currency to do amazing things. I was stunned by Pacific Century Cyberworks' recent move to acquire Cable & Wireless HKT for $40 billion in cash and stock." [...though we'd argue that that valuation is probably based on political influence.]

"Look at Healtheon -- it's gobbling up its industry. It buys up all these assets; integrating them will be a challenge. On the other hand, there's nothing wrong with starting out small businesses that grow up and get acquired," she says; certainly an appropriate view for an investment banker. She continues, "It's not a prudent operating philosophy to assume that we will have a correction.... For the smaller players, there are a huge number of viable market opportunities. They'll be challenged not to sell out. When a company with 100 employees and eight customers can sell out for $1 billion, it's hard to resist."

So is this simply a new market structure -- big companies buying R&D instead of performing it? "It's tough to tell how long the market will retain its robo-robustness, but one trend is very real: Capital continues to flow into new business ideas that are changing and will change the way business is done. Most of these companies won't succeed, but those that do, can succeed big. The capital markets have been allowing unprofitable small companies to get traction and have made it hard for larger companies to spend enough for R&D. The Net can allow small creative companies to stay small and outsource the uncreative functions cost-effectively.

"Up until now, we've had waves, about one a year, and each with its own poster child: UUnet was infrastructure; Netscape was Net software; Yahoo! was portals; Amazon was e-commerce; eBay was C2C; Healtheon was B2B. People focused on one thing. But now there are lots of new things simultaneously: wireless, ASPs, Europe, Asia, logistics. All these new things that truly deserve funding. It's all over the place!

"The reality is that it hasn't been a total bull market. No one's arguing about Navigator versus Internet Explorer anymore. In B2C commerce, Amazon has won. In C2C, eBay has won. Last year's theme goes by the wayside, but there's always a new story. So you have to assume that capital flows into the sector will remain robust. I think we'll have rolling corrections, but any serious correction would be driven by macro, indirect things. Other than rising interest rates, World War III, or a major disappointment with Yahoo!, Akamai, eBay and the rest all missing their quarters.” [A certain irony here!]

But, we ask, isn’t the hidden crack in the foundation a shortage of people despite the exuberance of the capital? Her good cheer diminishes: “This hiring issue! In my career, I have never seen anything as profound as today’s retention/recruiting problem. People are panicked. They take it for granted that you can hire people at reasonable wages and you can’t. I don’t know whether it’s worse for a Fortune 500 company or for an already-public Silicon Valley company. Last decade’s hottest industry sector vs. last year’s hottest IPO vs. all of next year’s IPOs.

“There’s a kind of desperation even more desperate than running out of cash. If they run out of cash, they resign themselves...and you can always lower your price. But people, you just can’t get them at any price. In the end, it’s about great people: Michael Dell, Ballmer, Gates, Bezos, Case...and there’s only one of each. The recruiting crisis is the problem that could in the end derail these companies....” But she regains her enthusiasm: “We’ve never seen a generation where people could rise to success so quickly. Your typical 25-year-old BA knows a lot these days. I have a blast working with these kids!”

On pricing, she disagrees with Steve Pelletier (below), although it may be a matter of emphasis, with Meeker more focused on institutional portfolios: “The institutions and insiders still hold the bulk of these stocks, although it may be the individuals doing much of the trading. The institutions’ interest in holding them keeps the demand high. Investors have chosen to adjust the risk profile of their stock portfolios by adding Internet stocks -- but for the most part, the percentage of their portfolios in ‘high-octane’ Internet stocks is low. The aggregate value of the public Internet companies is about $1 trillion (excluding Microsoft itself). It’s only two Microsofts. The float is $500 billion. There is a major supply-and-demand imbalance. People are aware...I don’t think a lot of retirees have their life savings in Internet start-ups. I think there’s enough information about the risks that large numbers of people are not being crazy about it.”

### Steve Pelletier, chairman, president & ceo, Offroad Capital -- Private market, public gains

We first met Steve Pelletier when he was heading development for Interleaf (UNIX-based desktop publishing) in Cambridge, MA, back in the early 80s. Since then, he moved to Intuit, learned about finance, and went through a traumatic almost-merger with Microsoft. Now, as ceo and founder of Offroad Capital, he runs the US’s first and only private-equity online auction market.

Basically, the company helps raise capital for private companies in a semi-public marketplace. All this would be unremarkable, except that capital-raising is highly regulated, and Offroad is perforce well-known to the SEC. Strict US regulations have helped create an honest market, but also a singularly inefficient one for many smaller enterprises.

That was something that Pelletier noticed as he was running Intuit's banking subsidiary, Intuit Services, which was sold to Checkfree for stock worth $225 million. "I felt that the whole capital market system would be enormously affected by the Internet. Wall Street serves large institutions, corporations. It's run as much by influence as by rules -- despite all the regulations." Pelletier wanted to create a rules-based market with equal access for the little guy -- not the retail investor, but the medium investors and medium companies caught in the middle. Offroad's goal is to make the private-equity market as lively and as friction-free as the public-equity markets, and let the non-high-tech market get its share of the action.

Rather than take on the established investment bankers (like last year's Forum speaker Bob Lessin of Wit Capital) or online brokers, Pelletier headed for the private-equity market. "Basically," he says, "we're creating a private securities marketplace that will serve smaller and eventually larger investors. We handle sub-$20-million private placements past the first rounds. Our investors are high net-worth individuals, family offices, smaller institutions -- the people most excluded in the current system. The Street throws them a bone once in a while, but mostly they're ignored. There are maybe 200,000 to 300,000 angels who have the occasional connections and time to invest directly, but this market is larger -- about 7 million households who fit the SEC standards for accredited investors, and they account for 70 percent of all direct investment [as opposed to mutual funds or pension funds] by individuals. And our issuers likewise have marginal connections. There are only 8000 companies in the US that trade on a stock exchange, but there are 20,000 or more private companies with more than 250 employees in the US alone."

Most of those companies find it almost impossible to raise equity, especially with all the attention going to dot-coms and high-tech start-ups right now. "The capital markets are choked with success," says Pelletier. "Everything has moved up in magnitude. People who would have been in professional services a couple of years age are now founding and funding companies with immediate national impact. High-growth companies are emerging everywhere these days, and the traditional funding sources just can't keep up, creating the opportunity for new entrants like Offroad. But the bulk of American small business is still funded by debt -- or not at all."

Ultimately, Pelletier wants to redress that balance: "All of our deals right now are high-growth sector companies, because that's what investors want to buy, because such companies are emerging at unprecedented rates and in non-traditional geographies, and because the traditional financing sources just can't keep up. But we were indeed founded to address the even larger problem of the chronic global shortage of equity capital for middle-market companies, which is a much bigger (and sustainable) opportunity. Right now, we do our own deals, but the future is largely third-party, where we will deal with others' deals and others' clients. To be a true marketplace, you have to be open to other intermediaries."

Meanwhile, he's fascinated by what has happened in public markets, and wants to have that same impact in private markets. "Valuations are being set by individuals, not by institutions," he says with delight. "More eyeballs looking at equities than ever before. A lot more people are setting price. They've taken over the system, for better or worse. They're assuming the economy will continue to grow. It's not about displacing old guys; it's about cashing in on an economy that they are helping to create. A market is not just the exchange of information, but collective assessment. Markets work only when investors can share information and jointly discover price; investing is a fundamentally social activity that is being enormously facilitated by the Internet."

So can Offroad run as honest a market as the SEC? we asked. In fact, Offroad is almost an SEC alumni club. Its first outside board member is Steve Wallman, a former SEC commissioner (and 1998 Forum speaker). And its economist (yes, it has one!) is former SEC chief economist Susan Woodward. "I learned a lot at Intuit," says Pelletier. "All the lawyers said the Department of Justice had no case against the merger, but it didn't matter. The DOJ contested it anyway and Microsoft called it off. In Washington, law's just one more plastic medium to achieve results. Our philosophy has been to approach this with public-policy goodness, rather than just legal constructs. We went to the SEC right from the start to make sure they knew what we were doing."

"We're setting rules, and we have to enforce them, but private equity is less specifically regulated -- which is why you need to be an accredited (and presumably well-informed) investor to play. To put hypertext in an S-1 almost requires an act of Congress," he says, betraying his past at Interleaf, which served many financial printing houses.

However, because the SEC carved out private equity as a less regulated market, Offroad takes special care to perform due diligence on the companies raising capital in its market. "We're one-third investment banker, warranting the quality of our [fund-raising] clients," says Pelletier. (The other two-thirds are broker-dealer and Internet broker.) Precisely because it is a private market, Offroad does not have to take all comers. It is not a government with a duty to all, but a competitive private organization capable of making discriminatory judgments. Thereby hangs an interesting tale about the future of regulation.

## PANEL: PRIVACY -- PRACTICE AND PRINCIPLE

*Privacy and security are hot topics, even though most people can't agree on what privacy means. Is the issue spam, or is it invasion of one's (sense of) identity? Do people really care about privacy? They always say they do on surveys, but they don't behave that way. Instead, they flock to offers of discounts and special services in exchange for their personal data. Yet they worry about credit card fraud, though more fraud is committed against merchants than against customers. How will all this be resolved: through legislation, consumer empowerment, or self-regulation? Should companies disclose privacy practices to investors as well as to consumers?*

*This whole topic, of course, is fraught with ironies, with muddled thinking, and with people attempting to do the thinking or make the choices for others. The so-called privacy advocates want to regulate what is done with consumers' data, forbidding certain practices outright. On the other hand, most marketers argue that they should control the data they collect; and consumers are free to ask them not to ("opt out"), and they will honor those requests. If most consumers want free content, they argue, then all should have it -- and we should have their data to pay for it. Those of us in the middle are disappointed that consumer awareness is still low...a failing on both the marketers' and the consumers' parts: marketers for not explaining and consumers for not taking the trouble to find out.*

*Both marketers and advocates say they represent consumer preferences -- but we think consumers should have the ability to choose for themselves as individuals here. This is not a question of people voting and everyone living with the consequences, but rather a marketplace where people should be able to make their own choices...consciously and with full understanding of the consequences.*

### Jason Catlett, president, Junkbusters -- Mirror, mirror in the screen

Jason Catlett, to put it bluntly, considers other people's privacy his business. Most of them would probably be grateful if they knew...but people are mostly as ignorant of the dangers to their privacy as they are of its protectors.

In fact, Catlett disagrees with that assertion. "It's certainly safe to say that most people have never heard of me. But are most really ignorant? I think the majority of people could identify spam, identity theft, having their name sold by marketers, compulsory genetic testing, street video surveillance, and several other threats to privacy." He adds: "I spent a long time working on technology for data-mining and direct marketing, and I've seen the large extent of intrusions -- and very little that restrains them. The US has few data-protection laws, and companies are funded by Wall Street to maximize data... i.e., damage to privacy. These are inexorable factors."

As an old data-miner, with a PhD in data-mining in late 80s from the University of Sydney, he might be considered the Oppenheimer of the technology: He has known sin. Do you feel like someone who built the bomb and wishes he hadn't? we asked. He quotes a point by Haldane and Einstein: "'Ethical progress is the only cure for the damage done by scientific progress.' Robert Oppenheimer said physicists have known guilt and this is a knowledge they can never lose. Technologists and data-miners have known guilt, though not all of them. There's a moral ambiguity to the bomb, and also to some uses of personal information. There are economic benefits to consumers.... But it should be done fairly. If all data-miners take an agnostic view of what should be done, there'll be very little ethical discretion from their masters in marketing. It's dangerous that the policy people in Washington and at corporate headquarters all have law degrees and no knowledge of the technology."

Even at Sydney, Catlett was teaching courses on social issues, and beginning to think about the implications of his work. But of course he thought about it in the context of social controls that exist in Australia (where there is also "self-regulation" of ISP content). When he moved to Bell Labs (in new Jersey) in 1992, he notes, there were laws about call-detail data, and committees to draft policy. "It was a practical concern for me -- how to do the right thing," he recalls. "But there I was, sitting in Murray Hill and watching the Internet come along. It would have been obvious to an idiot that the same kind of issues would arise, but scaled up. It wasn't just privacy but also junk communications. It is a problem, junk e-mail, junk messages; there are only so many you can delete. There's a time burden associated with it."

It's not just privacy Catlett wants to protect. He's also concerned about the overall commercialization of the world. "In terms of public space -- physically, tv, radio, the percentage of commercial messages is dangerously high and tends to push out other things." But what would you want to do about it? we ask. "I'd prefer a mailbox load that I can carry in one hand, a landscape free of billboards, and a phone that rings only with people I know."

He acknowledges a related public policy question: what to do about speech that may be politically beneficial? Is it okay to filter out political messages people "ought" to hear? "Ultimately there is a tension between the First Amendment, or the right to freedom of expression, and the right to privacy," he says. "The US Supreme Court has said, 'Nothing in the Constitution compels us to listen to or view any unwanted communication, whatever its merit; we see no basis for according the printed word or pictures a different or more preferred status because they are sent by mail.' The ancient concept that a man's home is his castle into which not even the king may enter has lost none of its vitality."

Junkbusters is a commercial company whose sole full-time employee is Catlett himself. His mission is pretty simple: to free people from what he calls junk communications, via information on its Website and a proxy server that can filter out banners and cookies and reporting to sites the URL that the user clicked on to get there. The goal is to create effective demand for privacy. Says Catlett: "In the long run, corporate America is going to realize that opposing privacy laws is as shortsighted as trying to abolish the SEC or the EPA. They ought to support them. The big guys can't be healthy in a world that's sick."

## Shelly Lazarus, chairman & ceo, Ogilvy & Mather -- I Be Moderate

If everyone were like Shelly Lazarus, Jason Catlett (Junkbusters) would probably see no need for legislation. “I feel strongly about privacy,” she says straightforwardly. “I’m a private person. I understand not everyone is, but everyone should be given a choice.”

Lazarus is the woman behind IBM’s groundbreaking initiative -- not so much a novel idea, but ground-breaking from a giant with a $500-million advertising budget. The initiative requires that IBM will adver-tise only on Websites that disclose their privacy policies.

Of course, Web advertising is only 10 percent of IBM’s total advertising spending -- but it’s a good start! As ceo of IBM’s worldwide advertising agency, Ogilvy & Mather, Lazarus has a lot of say about how that money is spent.

She notes, “It’s a general obligation of any supplier to protect the privacy of its customers, to use data only for the stated purpose. We’re not changing any rules; we’re simply making sure they’re observed.” Of course, she believes that most people will opt for more targeted marketing, but she’s a little more willing to let them decide for themselves than many marketers. It is on her watch that IBM has started running a series of commercials about the individuals at IBM.

Overall, Lazarus is a strong advocate of branding, and right now IBM is struggling to identify itself with e-commerce overall -- in a field crowded with Andersen (attacker of the e-spray approach), HP (all the way from the e-garage it was born in), Sun (the dot in dot.com), and on and on. Given the current furor over privacy, that could end up being a distinguishing issue for IBM.

As a marketer, Lazarus exemplifies the conflict the marketing world feels: Why don’t people like what’s good for them? They’ll get offers better targeted to their interests and needs. But she acknowledges they need to give permission first: “If what people say about DoubleClick is true, then that particular game is over. Everything is about trust. You can’t look into people’s eyes on the Web; it’s all about the brand.” So let’s give O’Connor a chance to speak for himself...and let’s look into his eyes.

## Kevin O’Connor, ceo, DoubleClick -- One man’s junk is another man’s manna

The last couple of months have been quite educational for DoubleClick overall and for founder/ceo Kevin O’Connor in particular. Somewhat like AOL/Time Warner in another context, DoubleClick has become a lightening rod for legitimate questions and for fears and fantasies. One issue stands out (which TRUSTe is also learning): Consumers are just beginning to understand how information can follow them from Website to Website.

In the end, the online privacy issue is not about Websites, but about collection of data. Simply having a privacy policy on a Website doesn’t deal with the underlying issues. DoubleClick ran into this in two ways: One, it collects and stores data *across* Websites (even though no names are attached); and two, it is acquiring Abacus Direct, with its database covering about 90 million households of information collected offline.

Basically, the company places online ads for its clients according to the assumed demographics of users. Today, DoubleClick targets ads based on the content of the Web page the consumer is visiting as well as generalized information (such as country, state, what type of company the user is coming from) based on the user's "IP network," says O'Connor. This information could be associated with cookies on users' machines that in theory only DoubleClick can see. (And certainly DoubleClick has no interest in releasing the data, because it uses that proprietary information to get paid.)

"People say that we *could* use it, but we won't. We'd be breaking our contracts. We'd go out of business; we're a trusted third-party. You'll never find a client where we've broken their trust," says O'Connor -- who indeed runs the Net's most used and most trusted (by clients) online ad network. "We log all this for accounting purposes, but right now we don't even use most of it yet."

Whatever, the potential for abuse created rumblings; when DoubleClick acquired Abacus and announced new privacy policies late last year, the rumblings erupted. After hoping for a while that the issue would go away, the company last month announced a new privacy *initiative* (as opposed to policy, notes O'Connor), promising internal oversight to build trust that the company will follow its own announced policies.

First, in the US, DoubleClick will do business only with Web sites that have a clear and effective privacy policy on their sites. The precise definition of that isn't clear yet, and O'Connor notes the contradiction: "People complain that they're too long, but they have to be long: They're contracts. You always get in trouble when you don't do what your policy says, so you have to be very careful what you say." The company has also hired PricewaterhouseCoopers LLP to perform periodic privacy audits. And it will have its own Consumer Privacy Advisory Board as well as a full-time chief privacy officer, reporting directly to the company's Board of Directors.

"We even have opt-out for anonymous information; others in the industry think that's excessive," notes O'Connor. But for privacy advocates, the issues arise when a profile gets matched to a specific name. O'Connor replies, "We have never associated a name with behavior on the Web. It would only be done with full notice and full choice."

Opt-in (where the customer has to ask to be included, as opposed to being included unless he "opts out")? we ask.

"No, opt-out," O'Connor replies. "We believe opt-out is in keeping with traditional marketing and is fine."

So would he support privacy legislation? "There is legislation," he asserts. "We are not against legislation. They need to start enforcing the laws they do have. The bad companies are tarnishing the good companies. It would make people feel more comfortable; there are so many bad things happening on the Web; people lump it all into one basket. We want to get rid of that.

"But for the rest, for non-sensitive information (excluding health, financial and sexual information), self-regulation can work.  We actually helped develop the industry guidelines with the Network Advertising Initiative (comprising most leading online advertisers).  The industry has gotten together and said this is how we'll conduct ourselves.  You don't need laws:  The court of public opinion can be pretty brutal!  People will stop doing business with you."  He points to IBM's initiative: "Asking people to do privacy policies is one thing, but saying they're not going to get money is something else.  I loved it!"

In the end, however, he says: "It's not about right or wrong; it's about offsetting benefits.  I feel pretty strongly about keeping the Internet free.  I've never seen such a clear message sent to a market:  Consumers are not willing to pay for content."

### Bruce Schneier, cto, Counterpane Internet Security -- The code kid

"When I was seven or eight, my father was always writing codes for me to break," remembers Bruce Schneier.  Yes, it was at young Bruce's request; he enjoyed the game.  "Of course," he adds, "it was all substitution ciphers, nothing complex.  I was young then!"  His father was a lawyer, but young Schneier studied physics at the University of Rochester.

After graduation, he took a job doing applied cryptography for the government.  "Actually, I was working for the different [military] services: Communications is the first thing to go between the forces."  After a brief stint at an unsuccessful start-up, he landed at Bell Labs in 1991...and was laid off after ten months.

It was a disguised blessing; the severance was a year's salary.  Says Schneier:  "If you're not thinking, you panic and get a job.  Or, you say, 'I've got a year to do something interesting.' I took my year to write a book.  I caught the crypto wave, and now I'm catching the Internet wave."

A lucid thinker, he dissects privacy carefully:  "There are two different types of privacy invasion.  One is targeted, where the attacker goes after a specific person.  Today this can be done with new tools and technologies.  The second is sometimes called data harvesting, where an attacker tries to get a list of, for example, every widow 70 years or older, with more than $2 million in the bank, who gives to more than a dozen charities and reads her horoscope regularly.  This is something that an attacker just couldn't do without computers and networks.  There were stories about bible scams and the like in the past, but it's on a much larger scale today."

And so he favors laws to protect security and privacy: "People never say, 'This is a great door lock, so we don't need laws against breaking and entering.' I spent years as a consultant, doing security design and analysis, and it was depressing.  I know all this great math, but the math is rarely the weakest link.  It's always something else that causes security breaches:  Overflow bugs, careless use of passwords, faulty installations of products that work flawlessly themselves.  My new mantra is 'Security is a process, not a product.'"

At Counterpane, Schneier's new company, he is building "processes to deal with inevitable fallibility of the products and how they are used and installed." As recent events show, "companies don't have the expertise to monitor their security continuously, and we can step in and fill that role." Counterpane's investors include Accel and Bessemer -- a $7 million investment at a valuation he keeps private.

On privacy, he sees the same problems: The technology goes only so far. "A company says, 'We're collecting such and such data and this is what we do with it.' But the technology has to be perfect in order to ensure those restrictions are enforced. You have to assume that the cookies you send will only be used for the purposes you intend. You have to assume that your Javascripts, your cgi scripts, your server-side includes and your plug-ins don't compromise security. You have to assume the databases you use are secure. It's a complex system, and complexity is the worst enemy of security."

"Everything is a single networked system now. Even MS Word is now a network application, just like Sendmail. But you don't have the same level of security people taking care of MS Word that traditionally managed Sendmail. If Sun has its way and your thermostat has an IP stack, it will be used to launch DOS attacks."

## PANEL: SCALING THE NET

*The Net wasn't designed to be a platform for consumer content or corporate transactions. Despite this, and despite many predictions of impending collapse, it has held up remarkably well so far. Going forward, all the elements of the Net's infrastructure must keep scaling to keep up with relentless growth. Meeting that challenge is a business opportunity, as companies such as Akamai and Level 3 have demonstrated.*

*What happens, though, as people start using the Net in new ways? Next-generation IP networks will distribute applications, rich media, transactions, voice and interactive content to a wide variety of access devices. What are the network architectures and business models that will make these services work? One of the thorniest issues is the relationship of content to conduit. Excite combined its content and audience with @Home's broadband data network, and AOL hopes to do something similar by merging with Time Warner. In both cases, though, the content side of the business still wants to reach users on other companies' distribution platforms. Are the synergies greater than the limitations?*

### George Bell, president & ceo, Excite@Home -- Excited about broadband

George Bell became ceo of Excite in 1996, having moved from Times Mirror magazines to build the fledgling portal into a media powerhouse. One of his gutsiest moves was paying tens of millions of dollars to put Excite's search engine on Netscape's home page, the starting point for legions of Netscape Navigator users. Many thought Excite wildly overpaid. But as Bell sees it, Netscape was the one that miscalculated, giving up control over its audience and not even demanding equity in return.

At Excite, Bell led a team on a mission to overtake Yahoo! as the leading Internet portal. The battle raged through virtually the entire commercial history of the Web, with Yahoo! remaining on top but Excite growing and innovating rapidly. Then, in January 1999, Excite did something that changed the game: It sold itself...not to another portal, but to @Home, the broadband ISP backed by most of the major North American cable companies. (Vindicating Excite's earlier moves, its price was significantly greater than what AOL paid to acquire Netscape.)

It has been quite a year.

Bell acknowledges that the integration of Excite and @Home wasn't as smooth as he had hoped. Though the companies were neighbors in Redwood City and were both members of the Kleiner Perkins keiretsu (see **Release 1.0**, 3-99), merging the two cultures has been difficult. The former Excite employees were used to the cutthroat battle over the huge narrowband Web audience, whereas @Home had spent four years building its network in conjunction with its cable partners and evangelizing a residential broadband market that barely existed.

Excite@Home has also had to fight a difficult and costly battle over whether competing ISPs are entitled to access to its broadband platform (see **Release 1.0**, 2-99). The merger of Excite's content offerings with @Home's broadband pipes fueled the flames that were stoked when AT&T

announced its acquisition of TCI, the largest shareholder in @Home. Though the FCC has repeatedly refused to intervene, several localities have passed open access ordinances, legislation has been introduced at the federal and state level and the public-relations battle has raged non-stop. AOL, the leading corporate backer of open access, has recently scaled back its efforts after it announced its proposed merger with Time Warner, putting AOL itself in the cable business (see page 3). However, the open-access controversy has yet to die down.

Amid all these challenges, Bell was promoted to ceo of Excite@Home in January, with previous ceo Tom Jermoluk remaining chairman. Bell says the company needed one leader to give it a unified strategic direction, rather than continuing as an amalgam of two cultures. Having worked in both new and old media, he hopes to position Excite@Home at the intersection of both, creating a new kind of personalized media. “The only thing better than the *New York Times* is ‘My *New York Times*,’ he says.

Bell sees the AOL-Time Warner deal as vindication of Excite@Home’s approach. “The dumb-pipe model has been discredited,” he says, taking issue with those who believe content services should be kept separate from underlying network infrastructure. “Fundamentally, media is characterized by content and distribution eras,” Bell argues, explaining that Internet-based media will be in the distribution phase for the next three to four years. But then everything changes: “If you look at any mature media, if you’re a survivor of the distribution wars, the loyalty accrues to content. There isn’t a single person that watches a TV show because it’s on a particular channel.”

Excite@Home recently passed a million subscribers for its broadband service. “There’s some point at which critical mass becomes your best marketing tool,” Bell says, speculating that for broadband the magic number is around four or five million. From the beginning, @Home has touted its network architecture, with a massive high-speed backbone and a large network of caching servers, as one of its biggest advantages. “All broadband is not created equal,” notes Bell. “The ability to cache more of the content significantly changes the user experience.”

### George Conrades, chairman & ceo, Akamai Technologies -- Not a simple task

Scaling the Net is Akamai’s whole business. George Conrades, named ceo last April, says the scope of the challenge is what attracted him to the company: “It’s not a simple task, and it’s an exciting task.”

To solve the Internet’s performance bottlenecks, Akamai has built a network of more than 2500 servers on 100 networks in over 50 countries. (For a detailed discussion of Akamai and other content-distribution players, see **Release 1.0**, 12-99.) It has rapidly signed up many of the Net’s largest content providers as customers, offering them improved end-to-end performance by delivering content intelligently from the most efficiently placed server at the edge of the network.

Following a successful career at IBM, Conrades in 1994 became ceo of BBN, the pioneering networking research and development company that became a major Internet backbone and Web-hosting operator. GTE acquired BBN in

1997; Conrades was president of the re-christened GTE Internetworking before moving to Polaris Venture Partners and then to Akamai.

Conrades says his experience building large hosting centers at BBN helped him understand the value of Akamai's approach, which he calls "the idea that one could use thousands of servers across hundreds of networks, as opposed to tens of data centers on one network." Akamai is able to make its system work, Conrades says, because of the sophistication of its algorithms, originally developed at MIT. Almost half the company's 300-plus employees work in R&D, and 40 of them have PhDs.

Conrades believes the key to scaling Internet performance is to move content and application processing to the edge, rather than sending information across unpredictable backbone networks. Users don't want to wait, he explains, and they expect the same response times over the global Internet that they had back in the mainframe days with dumb terminals directly connected to local hosts. For low-bandwidth uses such as text there's little benefit from distributing content to the edge, but Akamai's approach pays dividends for images, rich media, transaction-processing and applications such as personalization, search and ad-serving.

Though Akamai initially distributed only static information, it now partners with application vendors to allow dynamic and transactional content to flow across its system. Conrades says Akamai makes life easier for content sites because it partners with service providers such as Engage and DoubleClick. Rather than having to develop these relationships themselves and figure out how to deploy functionality across hosting centers and networks, the content sites can work with Akamai. Akamai is agnostic towards these application providers (as well as to caching vendors, backbones and ISPs), leaving the choice up to customers while focusing on its core performance enhancements.

Throwing bandwidth at Internet performance problems isn't sufficient, Conrades argues, because there's still a need to optimize responses to shifting user demands over many rapidly changing networks. "As long as there are multiple routes to the user that are more or less congested, you have an optimization opportunity," Conrades explains.

Conrades dismisses those who see Akamai as just another caching solution that provides temporary benefits until more bandwidth allows "dumb and fast" networks to prevail. "The complexity of the networks is at the edges," he stresses. And this complexity will only increase with new applications and services. In such an environment, he argues, Akamai's unique, sophisticated algorithms make a big difference.

Akamai plans to continue deploying servers throughout the edge of the Net, Conrades says, providing ever more options for efficient delivery of content and applications. Conrades believes that Akamai's caching and distribution algorithms could ultimately be incorporated into every PC.

**Jim Crowe, president & ceo, Level 3 -- Taking the Net to a new level**

In his previous job Jim Crowe shook up the communications world. Now he has his sights set on something bigger: building the first truly converged global network. As chairman and ceo of MFS Communications until its acquisition by WorldCom, Crowe led one of the first and largest competitive local-exchange carriers that helped break local telephone monopolies in the US and Europe. At Level 3, which he took over in 1997, Crowe is spearheading deployment of a massive network that melds the best elements of the Internet and telephone worlds.

As far as Crowe is concerned, the case for new networks is simple economics: “At the heart of the whole business these days is your assumption about the rate at which you can drop unit costs and prices, and the amount of price elasticity,” he explains. Level 3 is convinced that bandwidth demand is hyper-elastic, and that price-performance improvements will be incredibly rapid. In other words, the price of bandwidth will continue to drop, stimulating demand even faster in a virtuous circle. In such a world there’s no such thing building too much capacity, though Crowe acknowledges this is not a universally held belief. “Much to my amazement there continue to be a fair amount of people who worry about overage in capacity,” he muses.

A further conclusion Crowe draws from the plunging unit costs of communications is that “you’re going to watch the whole notion of any kind of vertical integration in the industry fall apart.” It’s the same thing that happened in the computer industry, he argues. Vendors like Intel and Dell succeeded by becoming good at one thing, rather than trying to dominate the entire value chain. That way, they were able to keep up with rapid technological change.

In communications, however, there’s still a battle between those who believe in the need to bundle content, various services and network infrastructure to “own the customer” and those such as Level 3 that concentrate on a specific layer. Crowe is convinced that “it’s just too hard to be everything to everyone.”

In practice, focusing on infrastructure in an era of rapid price-performance improvements means rethinking traditional notions about how you build a network. Instead of rebuilding the entire network every 12 to 14 years, you do so every four to six years, with depreciation schedules set accordingly. Instead of putting the amount of fiber you think you’ll need into the ground, you put in much more, along with empty conduits so that future deployment is cheaper and faster. You plan to swap out hardware such as repeaters and amplifiers, even switches, far before their useful life ends, because new technology makes them obsolete.

The new thinking that Crowe espouses isn’t limited to hardware. A truly converged network will be able to carry voice traffic with the same reliability as the traditional circuit-switched telephone network. That requires new software to manage and provision services over IP.

“If IP is going to become the platform for communications in the future,” Crowe says, “we need to be able to provide a whole series of predictable grades of service.” The market will define what those grades are; live streaming video will have different requirements from e-mail, for example. Enabling such differentiation at the required scale, though, requires a whole new supply chain of so-called operations support systems. Level 3 and others are deploying vast amounts of capacity, but that isn't enough. “It takes an incredible amount of intelligence to keep a big dumb network up to date,” Crowe notes.

The first step toward that intelligence, Crowe believes, is multi-protocol label switching (MPLS) technology that allows priorities to be applied to different traffic flows as they make their way through the network (see **Release 1.0**, 5-98). The next is to use directories to manage network roles and provisioning in an automated way, though so far Crowe sees most of the effort in this area focused on the edge of the network rather than the core.

Traditional telephone companies and their vendors are starting to think about these challenges, and Crowe is convinced their standards bodies will develop an answer...three or four years too late. And the timing is critical, because demand will only grow. “Whatever we think of as broadband today will be narrowband in five years,” Crowe predicts.

### Danny Hillis, vp, R&D, Walt Disney Imagineering -- It's alive!

It's hard to find someone who has thought about scaling in more ways than Danny Hillis. At Thinking Machines he pioneered massively parallel computing and RAID disk arrays, transforming the way computer scientists thought about scaling processing and storage. Working with organizations such as the Santa Fe Institute, he's looked at the ways natural and artificial systems scale and manifest emergent properties beyond thresholds of complexity. He's even considered how to build a clock that scales across 10,000 years of time, as co-chairman of the Long Now Foundation. (Disclosure: Esther Dyson is on the board.)

Since 1996 Hillis has been a Disney Fellow, applying his talents to develop a new generation of educational and entertainment products. He and Imagineering evp Bran Ferren recently announced they were leaving Disney to found a new company, Applied Minds, though Hillis isn't yet ready to disclose their plans.

When asked how the Net will scale, Hillis first responds with his (presumably mouse-eared) entertainment hat on. “The Net will absorb every communications medium, every bit of spectrum,” he says. “It's just a matter of time before you watch your TV over the Net.” As this happens, Hillis believes, services will no longer correspond to particular types of signals. Your phone calls might be delivered over a cable network and your Internet connections over a wireless link, rather than the present coupling of content to conduit. The trouble, he says, is that “the entertainment industry is still used to living in a world where the content is tied to the transmission medium.”

Switching gears, Hillis spins out a picture of what the Net of the future will look like -- and act like. “Right now the Net is mostly used for communications,” he says. “It gets much more interesting when computers start talking to computers. At that point the Net effectively becomes one big parallel computer. We can start using the intelligence of that distributed computing system instead of the switching network of the telephone system."

Hillis sees that intelligence being used for new kinds of computation that were never possible before. "This almost infinite pool of distributed computation will be an attractive tool for new kinds of software to evolve towards," he predicts. Artificial life and artificial intelligence, for example, become more feasible as distributed computers come closer to simulating the processes of evolution and the human brain.

But here the engineering world exhibits the same failing as the entertainment industry: unwillingness to abandon traditional biases. Applying biological metaphors to computer science "doesn't fit well with the culture of engineering," says Hillis, "because engineering is about control, and biology is all about accepting complexity."

Despite this lack of vision among many in the engineering community, Hillis sees new distributed computational services emerging on the Net. He points to Inktomi's search service as an early example, but sees it as only the beginning. If someone developed good algorithms for one aspect of natural language processing, for example, he or she could make that capability available through the Net and compete with other providers, even though such a function wouldn't support a traditional business.

The Net is an autocatalytic system, Hillis says. Engineers talked about something like it for a long time; then suddenly it exploded into prominence. Going forward, he feels, the limitation on the Net's growth will not be bandwidth, which he compares to home electricity -- something that was once scarce but now is taken for granted in places like the US. The constraint will be the Net's mind-boggling complexity.

"Already the Net is the most technically complicated creation of humanity," Hillis explains. "It's the first thing we've built that we don't have a wiring diagram of." Today that's not so much of a problem because we're still using the Net for well-understood applications. But to support new applications, Hillis says, "we're going to have to develop a different discipline of designing complicated things." And that discipline, he predicts, will resemble biology more than engineering.

## CONVERGENCE POINTS

*We want to give you a chance to see, hear and touch the best new gadgets and software innovations, most of which don't fit neatly into the other parts of the Forum. We also want to explore some cross-cutting trends that will shape the future of the industry. So this year, in addition to the company presentations, we'll have three afternoon sessions we're calling Convergence Points.*

*Think of these sessions as conversations. Each will have a host to help you find your way around and to catalyze the discussion. There will also be people and products showing off some of the most intriguing examples of each theme. The rest is up to you!*

### PERVASIVE COMPUTING: Hardware meets the Net

The post-PC world is coming. Our beloved PCs won't go away; they'll simply be outnumbered and made less relevant by legions of new devices. Consumer-friendly computing appliances that do one or a few things well, and that take advantage of the Net, are finally coming on the market. We're not that far from a world of billions of Internet-connected devices, most of which look nothing like PCs. What are the killer apps that will make computing ubiquitous? How will the industry change, and more important, how will everyday life change? How soon will this conference change its name to the Pervasive Computing Forum?

Seth Goldstein, entrepreneur-in-residence and head of the pervasive computing initiative at Flatiron Partners, will be your host at the pervasive computing pavilion. With a little help from his friends, he'll explore some of these questions. You'll also be able to try out cutting-edge devices including:

- **Kerbango** Internet-connected radios
- **Ceiva** digital picture frames
- **Inviso** miniature-screen handheld Internet Companions
- **Cybiko's** Wireless Intertainment System for kids
- **Internet Appliance Network** (IAN) Virgin Webplayers

### WEB-BASED APPLICATIONS: Software meets the Net

The success of Hotmail and other free Web-based e-mail services has spurred an avalanche of new services that turn the shrink-wrapped software model on its head. Web-based applications are available anywhere you can find a browser and an Internet connection. They disrupt desktop software pricing models. And they do things that standalone packages simply can't (see **Release 1.0**, 1-00). Is this the death of software as we know it?

Dave Winer, ceo of Userland Software, has been writing software to put into boxes for a long time. But most of the products he's working on today are hosted on servers and deliver full functionality to a browser. We wrote about Userland's server-based Web authoring and syndication tools last summer (see **Release 1.0**, 7/8-99). At PC Forum, Winer will demonstrate **Userland Manila** and will host a session with several other startups pushing the leading edge of the Web-based application space:

- **HalfBrain** makes the BrainMatter dynamic HTML spreadsheet.
- **Bitlocker** lets users quickly build Web-based databases.
- **Pyra** created Blogger, a tool for creating personal "weblogs."
- **1010data's** Web-based database delivers enterprise-level performance.
- **ThinkFree** offers a full office productivity suite via the Web.
- **Trellix** makes it easy for anyone to create and publish a Website.

### OPEN-SOURCE APPLICATIONS: Software development meets developers

With the stunning IPOs of Red Hat and VA Linux Systems, open source has gone mainstream. The Linux operating system is popping up in all sorts of places one wouldn't expect. Creative companies such as LinuxCare and Collab.Net are building for-profit businesses around free software. Even big established companies such as IBM and Sun are scrambling to figure out how they can participate in the open-source movement.

Linux has been the poster child for the open-source approach. But it's hardly the only example of a passionate group of developers building commercially viable software because it's what they want to do or because it meets a need. There are an incredible variety of open-source projects underway, many of them developing applications that run on Windows.

As it happens, we'll be using Linux machines for Web and e-mail access stations at this year's Forum, courtesy of VA Linux Systems. VA Linux ceo Larry Augustin will host the open-source applications session, and will showcase the diversity of open-source applications. Is open source a huge untapped opportunity for your company? Or a terrible threat? Or just a bunch of hype? Come and find out!

## COMPANY PRESENTERS

*This year, for good luck, we'll have 13 company presenters illustrating business opportunities created by the convergence of the virtual and real worlds. Eight of them are debutantes, launching their companies or products at the conference: Firedrop, Onepage, Open Ratings, Propel, Soliloquy, Spotlife, Terabeam and ViaFone.*

*We've divided the companies into three broad categories. We hope this sparks some thinking about the parallels among businesses whose products and target markets seem very different. Taken individually, each of these companies is doing something novel and interesting. Consider them together, however, and you'll get a sense of how the Net is closing the gap with the physical world -- not recreating it, but taking the conveniences, tools, interfaces and interactions we've learned to expect in the real world and blending them into a virtual environment. The three company presenter groups are:*

### CONVERGING CONTENT

Data formats and applications are becoming fluid and easier for users to control. These companies make it possible to view, aggregate, and manipulate information in new ways and on new platforms.

- **Desktop.com** puts a full desktop environment on the Web, changing the way applications are developed and deployed.
- **OnePage** lets Internet users pull together the information *they* want, rather than wandering from site to site.
- **ViaFone** enables wireless e-commerce, freeing users to transact online from almost anywhere.
- **FusionOne** synchronizes data across all devices and applications.

### CONVERGING COMMERCE

As software agents improve at mimicking (or surpassing) humans, and architectures become more scalable, e-commerce is beginning to overcome some of the traditional advantages of physical marketplaces.

- **Soliloquy** builds conversational user interfaces to help users purchase complex goods.
- **Propel** provides a total solution to help online merchants scale their back-end infrastructure.
- **Support.com** automates both the process and the substantive aspects of technical support.
- **Perfect.com** facilitates optimal transactions among buyers and sellers in digital marketplaces.

## CONVERGING COMMUNITIES

The Net makes it possible for people to communicate, collaborate and express their views in powerful ways, but it takes a new set of tools to truly empower these virtual communities.

- **Open Ratings** incorporates user feedback into an independent, distributed rating service for all forms of e-commerce.
- **X-Collaboration** allows distributed teams to work together and share information more effectively.
- **Firedrop** has created a new communications platform combining e-mail, the Web and instant messaging.
- **Spotlife** makes personal video broadcasting over the Net as easy as point and click.

The final company, **Terabeam,** is in a category by itself; it will be doing a live demonstration of its new broadband wireless technology throughout the conference.

*Below are descriptions of each presenter, in alphabetical order, with (D) denoting debutantes.*

### Desktop.com

Desktop.com has created a complete desktop user interface, including windows, menus and a variety of applications, all accessible through a Web browser (see **Release 1.0**, 1-00). The company, founded in December 1998 and based in San Francisco, now has about 60 employees. It raised $29 million in its first round from Sequoia, Accel Partners and Kohlberg Kravis Roberts, and it launched its beta service in September. Co-founder and ceo Katie Burke says “hundreds of thousands” of users have signed up for the beta, and the company plans to announce its official launch soon.

Burke says the company arose from two insights: The Web is turning software into universally accessible services, but users today are forced to go to several sites to find the Web-based applications they want. Desktop.com gives users an integrated environment for an array of Web applications, while giving developers tools and distribution that make it easier for those applications to be created. “We talk about ourselves as a Webtop for consumers, and a platform for developers,” Burke says.

Burke and co-founder and cto Larry Drebes previously built Rocketmail, one of the first free Web-based e-mail services, which they sold to Yahoo! Burke realized services such as Rocketmail reflected a change in the very nature of software. “Eyeballs that used to be sitting on an $89 version of Eudora were now sitting on a Web page,” she says, adding that she became convinced the model would extend from personal information management to virtually every other application category.

But some pieces were missing for this vision to become a reality. For developers, Burke notes, “there’s no Web service infrastructure for building and deploying applications.” Desktop.com provides a hosted service to support Web-based application on the back end, and offers developers an application programming interface and pre-defined components that simplify the development process and make different apps work together better. It then gives those developers access to an aggregated user audience. Desktop.com plans to offer developers various incentives to create new applications that users find valuable. In some cases developers want financial incentives, but in many cases the glory alone is enough, Burke says: “Developers got excited at the prospect of something they built as a hobby being live on a consumer service.”

For consumers, the Desktop.com service starts with a personal, portable space on the Web to store their data. Burke says this service alone has value, but it’s only a small part of Desktop.com’s offering. Users benefit from the personalization, interface consistency and wide variety of applications Desktop.com offers. The beta site includes news readers, stock tickers, a notepad and even a runner’s log; Burke promises many more once the full service launches. And because the applications are hosted and delivered to a browser, they can integrate content such as news feeds and stock quotes that aren’t available in desktop software.

Desktop.com is now evolving its service in response to feedback from beta users. Burke says consumers cared less than expected that the interface match what they were used to on the desktop. Developers asked for tools to output static HTML in addition to the sophisticated Javascript-based interface elements Desktop.com introduced. In its next release the company plans to address these issues, and also to make it easier for users outside the Desktop.com environment to take advantage of the applications the company hosts.

### Firedrop (D)

Try going to Firedrop’s Website to learn about what the company is doing, and you’ll find a dictionary definition of the word “stealth” and not much else. Co-founder David Roberts says the startup needed time to develop and protect its technology before taking the wraps off, because, “we’re creating an entirely new communications platform.” To get the full details you’ll need to wait until PC Forum, but here’s a taste.

Firedrop will offer a new kind of service at the intersection of e-mail, the Web and instant messaging. Just as the convergence of the telephone and printing created a new communications tool in the fax machine, Roberts says, Firedrop hopes to use the convergence of online communications methods to build a platform that “opens up a whole set of opportunities for other dot-com companies as well as people to communicate in new ways.”

Roberts and co-founder Brian Axe met on a houseboat trip, where they discovered that though they didn’t know each other, most of their friends overlapped. Each often found himself coordinating activities among their acquaintances, and they decided to develop technologies that made such processes easier using the Net. Before Firedrop, Axe worked at Golfweb, a golf content and e-commerce site later sold to Sportsline. Roberts’ background includes a stint at the Central Intelligence Agency. (He can’t say more or he’d have to kill us....) Firedrop quickly raised an initial investment from Kleiner Perkins; Excite co-founder Joe Kraus is also an investor and board member. The company currently has 86 employees and full-time contractors.

Roberts says the trouble with group communications over the Net today is that the Web wasn't designed for such interactive, asynchronous tasks. "The Web is a wonderful place to visit," he explains, "but you actually have to go there. People are much more comfortable doing everything at home and having the world come to them." As a result, people invariably revert back to e-mail for one-to-many or many-to-many communications. The result, however, is a deluge of unconnected e-mail messages that can create more work than they eliminate. "In a world that keeps getting busier, the ability for people to meet coincident in time gets more difficult," Roberts says.

Firedrop's solution is to meld the best elements of the Web -- rich content, interactivity and commerce -- with the asynchronous, individually directed mechanisms of e-mail. The new platform runs on top of the existing Web and e-mail infrastructure, making deployment easy. By taking a platform approach, the company hopes to enable a wide range of group communications functions and to catalyze other companies to build other applications that take advantage of this capability. For partners, Roberts says, Firedrop's technology will offer a new low-cost customer acquisition vehicle, as well as a way to extend their brands and services far beyond their Websites.

### FusionOne

We covered FusionOne's synchronization service last year in our discussion of new tools for "living on the Web" (see **Release 1.0**, 6-99). Since then, the company has moved to San Jose, signed deals with partners such as Snap.com and received investments from Nokia and 3Com to supplement its earlier round led by El Dorado Ventures. Most significantly, FusionOne has brought its service to public beta and has built out its back-end hosting infrastructure through a deal with Sun.

Ceo Rick Onyon describes FusionOne as "an Internet service designed to put your information wherever you want it." Its synchronization offering manages content, ranging from files to address-book and calendar entries, across all devices that a person uses. By devices, Onyon emphasizes, he means both physical equipment such as cell phones and PDAs as well as virtual devices such as applications running on a PC.

The vision, Onyon explains, is for information in a desktop application such as Outlook to be treated no differently from information on a portable device or hosted on a server accessible from anywhere through the Web. "Most people who create new Web applications propose you give up your old client application on your PC," he says. "We think that's unrealistic, and that you shouldn't be required to choose."

FusionOne uses a transactional model, unlike earlier synchronization services designed around a peer-to-peer architecture. The first-generation services are inefficient and cumbersome, Onyon notes, because the two synchronized devices must be directly connected and must understand the other's data formats. "Our model says that none of your devices know that any of the other devices really exist," Onyon says. Instead, each device has a small software agent that communicates with a central repository whenever a transaction occurs.

One benefit of this architecture is scalability. Onyon says FusionOne could support 100 million simultaneous users, because the only things passing back and forth over the network are small update transactions. The central data store is nothing more than a huge amount of dumb storage using FTP; the bulk of the processing takes place on the edge. Every edge agent subscribes to the class of transactions appropriate to that kind of device, and reformats content as necessary. This way, each device gets the information it can use. "A Word document is irrelevant to my phone," Onyon says by way of illustration.

Another, less obvious benefit of a transaction architecture is that it allows FusionOne to do much more than simple synchronization. "We allow you to grab little pieces of content that are out on the Web at large, and integrate them into your offline or device world," Onyon says, giving an example of a travel site that could include a button to automatically download itinerary information to a user's calendar application. The calendar entry would also include a link back to the travel site, boosting the site's traffic. And that's only the beginning. "Once we've got all your content in this digitally secured collection on the Internet, we can provide value-added services on top of it," Onyon promises.

FusionOne's business model is to offer its client software free directly to users or through partners. The basic synchronization is free and advertising-supported, but premium services will involve a subscription fee. FusionOne will share some of those fees with its partners, but only with the partner that first brings in the customer. Because so many sites and device manufacturers could potentially incorporate the FusionOne functionality, Onyon believes partners will have an incentive to market the service aggressively. FusionOne will concentrate on building its brand as a trusted intermediary, much like the Cirrus network that connects bank automated teller machines.

### OnePage (D)

OnePage hopes to change the way people think about content and applications on the Web. "The Internet is becoming a huge database of information," says ceo Will Chen. "There's got to be a better way of accessing that information." Before OnePage, Chen was a founder of Billpoint, a person-to-person billing enabler that was sold to eBay last year. He hooked up with co-founders Michael Marubio and Michael Timmons, who developed OnePage's core technology, and with two former Billpoint colleagues to start OnePage at the end of last year. (Disclosure: Kevin Werbach is an investor in OnePage.)

OnePage's technology lets users capture, aggregate and manipulate information from different Websites in a personalized interface. Today, explains Chen, "there's a tremendous amount of valuable information that's available for users, but navigating the Web is a serial process. You go to a site and find the information you want." But the information users want may not be located on a single site. Even when portals aggregate content from many different sources, they aren't likely to offer the exact mix that a particular user wants. Consequently, users must jump from site to site, a cumbersome process.

What's needed, Chen says, is "a new graphical user interface for the Web," one that allows users to organize information in the way that works best for them. For example, a user interested in golf wants more than just golf-oriented content; he or she may want various e-commerce offerings, reservation services for tee times, even the weather near the golf course. Vertical portals attempt to offer such thematic information, but the best content and services might still be on another site. And in many cases there's no portal for the specific kind of content a user a user considers important. If you're planning a vacation with a group of friends, for example, it's unlikely any one site will have exactly the set of information you need. "Every site is making a judgment call on what it is you want to see," says Chen. "They are, in effect, editing your experience."

OnePage uses proprietary pattern-matching technology to pull content from sites. The hard part is parsing dynamically generated content and keeping links in place as URLs change. Creating a simple user interface to display the aggregated information is also a challenge. Chen distinguishes OnePage's approach from basic personalization, such as My Yahoo! offers, and from bookmark or personal account aggregators such as VerticalOne (see **Release 1.0**, 7/8-99). OnePage will allow users to combine any information relevant to them and organize it to create a personalized Web experience. Chen believes people will take advantage of the service to view information from far more sources than they do today.

Chen sees existing content sites as potential partners, rather than competitors, because OnePage displays only headlines or similar snippets of content, with a link back to the original site when users want the full details. Because OnePage will aggregate a substantial user base and will have information about what those users are interested in, Chen says, it will also be in a good position to connect consumers with businesses that want to market to them, should the consumers give their consent.

The company, which is based in Redwood City, raised its seed funding from Allen & Company and angel investors including Teligent founder Bill Berkman, CDNow chairman Jon Diamond, Drugstore.com founder Jed Smith, former Time Warner co-ceo Nick Nicholas and Harvard Business School professor Michael Porter.

### Open Ratings (D)

Open Ratings grew out of work led by Pattie Maes in the software agents group at the MIT Media Lab. If that story sounds familiar, it's because Maes previously turned her work on collaborative filtering into Firefly, which was ultimately bought by Microsoft (see **Release 1.0**, 11-96). Maes' group was also the genesis of Frictionless Commerce, a debutante at last year's PC Forum (see **Release 1.0**, 3-99). Like the other two companies, Open Ratings is dedicated to improving the e-commerce experience. It focuses on a different problem, however: the issue of trust.

“We believe that there is a major problem in e-commerce, namely that there is a lack of trust in many marketplaces between buyers and sellers,” says Maes. She continues: “As a result, fewer transactions occur than are possible, and the transactions are at lower dollar amounts than could be the case. We see this as a big opportunity.”

Maes believes that a comprehensive neutral system of third-party ratings is the answer to the e-commerce trust gap. Research conducted at MIT’s Sloan School of Management found that shoppers would increase the value of their online purchases by 8.5 percent if such a system were available. With e-commerce already in the tens of billions of dollars per year, that’s a large number, and it doesn’t include the transactions that won’t happen at all without independent ratings.

Maes co-founded Open Ratings last year to address this opportunity; ceo and co-founder Stan Smith was previously vp and gm of Agile Software. Open Ratings received funding from Atlas Venture, Nicholas Negroponte of the MIT Media Lab, PlanetAll co-founder Brian Robertson and ViaWeb co-founder Mark Nitzberg.

Some e-commerce sites, such as eBay and Amazon.com, already support user ratings, but Maes says these offerings are flawed. First, such ratings tend to be proprietary to a single site, even though consumers transact across many different marketplaces. If you develop a good reputation as a seller on eBay, it doesn’t help you when you want to auction items on Amazon.com or Yahoo! Open Ratings will support ratings that persist across the Net, for both buyers and sellers. “Our view is: Whose reputation is it?” says Smith. “Is it eBay’s? No.”

Maes adds that existing systems tend to be technically unsophisticated and easily manipulated. Most allow only “good” or “bad” feedback, rather than supporting shades of gray. There is bias toward positive feedback, because raters fear retribution if they give someone negative comments. On eBay, for example, an analysis conducted at the Media Lab found that more than 98 percent of all feedback was positive. Cheating, such as selling a large number of low-value items to yourself or a partner to pump up positive ratings, is also rampant.

The Open Ratings system is designed to foil such attempts, using a variety of algorithms to identify and neutralize misleading behavior. It also rates the raters themselves. If your previous ratings were consistent and predictive of others’ future behavior, the weighting of your views increases.

Open Ratings is not building a destination site. Instead, it plans to provide its ratings as a back-end service to all interested marketplaces. Both buyers and sellers can be rated, and those ratings can carry over from one site to another. Open Ratings will charge service fees to the marketplaces, but to avoid any perceived conflicts and friction in the process, the fees will not be tied directly to the number of transactions generated. The company also plans to syndicate content, such as lists of top-rated products or merchants, to interested content sites.

Smith anticipates that 75 percent of the company’s revenues will come from business-to-business marketplaces, but says the service will also be valuable for business-to-consumer and consumer-to-consumer transactions. He says that in all cases, rating systems are a natural extension of online marketplaces: “The market-makers are responsible for attracting buyers and sellers, for building a robust community. We provide the mechanism for these buyers and sellers to get to know each other.”

Maes believes that Open Ratings will help level the playing field for e-commerce. Despite the democratizing promise of the Net, the companies that spend the most on marketing tend to get most of the traffic. Maes calls Open Ratings “a word-of-mouth type of system for building up a brand or reputation.” Companies that provide good service can attract customers based on reputation, rather than the number of television commercials they run.

## Perfect.com

Imagine a perfect market, the fantasy of economists everywhere. Buyers and sellers would engage in optimal transactions, matching preferences across many different parameters and large numbers of participants. With perfect information, everyone would get the best possible deal; sellers would compete on overall value. And it would all happen seamlessly and automatically, without the need to haggle or to evaluate bids manually. That’s the vision of Perfect.com.

Perfect.com was founded in May 1999 to leverage the work of Stanford economics professor Paul Milgrom, a noted auction and market-efficiency theorist. Ceo Kevin Surace was formerly evp of General Magic; investors include Andy Bechtolsheim, Eric Schmidt, Bob Lessin, Jeff Berg, Will Lansing and Ben Rosen. The company’s big idea is to take the most sophisticated mechanism for matching transaction terms in the physical world -- the request for quotation (RFQ) -- and bring it to the Web.

In a traditional RFQ process, the buyer specifies as many aspects of its needs as it can in a detailed request document, which it sends to prospective sellers, who respond with equally detailed proposals. “When you look at all the variety of processes that exist, the one way at the end is the traditional RFQ,” says ceo Kevin Surace, noting that because they are both highly efficient and highly cumbersome, RFQs are typically used for large industrial purchases. By automating the process over the Web and reducing the time and cost involved, Perfect.com hopes to bring RFQs to a much wider variety of transactions.

Surace explains Perfect.com’s mission succinctly: “Buyers buy in multiple dimensions. Sellers sell in multiple dimensions. We’re building a much more scalable and efficient market for them.” The company is focusing primarily on providing back-end solutions for business-to-business (B2B) marketplaces (see **Release 1.0**, 9-99).

In the B2B space, one of the biggest challenges for digital marketplaces is what Surace calls the “firehose syndrome.” Buyers and sellers in vertical markets such as plastics or chemicals that received five requests for quotes a day in the physical world may find, upon joining an online marketplace, that they are swamped with thousands of requests and offers. These marketplaces are valuable because they aggregate so many buyers and sellers, but that also can make them unusable without some automated system to facilitate transactions. “If you don’t automate the markets, it turns out they can’t scale,” says Surace.

The Perfect.com RFQ engine allows buyers to represent their preferences in a multi-dimensional bidding proposal. The system represents the sellers and creates multi-dimensional bids based on their individual strengths. Then, it quickly matches buyers and sellers, and returns an ordered and scored list of results to the buyer. Perfect.com offers market-makers a complete turnkey system that not only generates matches, but automatically generates HTML pages consistent with the marketplace’s user interface. Surace says the ultimate goal is to be able to plug in the Perfect.com engine and create a new B2B marketplace in 30 minutes or less. The service is offered on a hosted basis, so that the marketplaces need not deploy any new infrastructure.

### Propel (D)

Steve Kirsch founded Infoseek and two other successful technology companies, so he has seen first hand the challenges of building scalable backend systems amid hyper-growth. With his new venture, he thinks he has found a way to overcome many of those challenges, and to replicate the solution across many companies. “The problems that we’re solving at Propel,” he says, “are that Websites take too long to create, cost too much, are expensive and difficult to maintain, don’t scale well, are unreliable and don’t focus on the user experience.” Tall order, indeed!

Kirsch says his basic insight with Propel is that many sites face the same challenges, but are forced to recreate the solutions from scratch. “If we were to build automobiles the same way that we’re building Websites today, each of us would be creating our own custom car,” he says. Instead of cobbling together separate pieces each time, Propel will provide Internet companies with an integrated, optimized solution with core functionality out of the box, while preserving their freedom to customize their offerings. “People are building infrastructures out of necessity right now,” Kirsch argues. “They are being their own system integrators.” Propel plans to give Websites an alternative, so they can focus on the customer experience rather than building functionality that has become a commodity.

Propel will offer several products and services that allow companies to create a superior experience for their users. At the core is a platform that integrates components such as databases, application servers and caching servers and incorporates load balancing, failovers and other elements of large, high-volume sites that traditionally have been assembled ad hoc. “If you want high performance, you really have to think about how to do that from a total systems point of view, and not from a component point of view,” argues Kirsch. Because of its end-to-end approach, Propel believes it will be able to deliver maximum throughput from each of its components.

Kirsch acknowledges that commerce-server vendors could eventually build out to something like what Propel offers, but he sees them as too focused on their direct competition and meeting feature requirements to step back and take a truly comprehensive perspective. Propel will connect to legacy systems and will integrate off-the-shelf components to the extent it makes sense, always focused on maximizing overall performance.

Propel currently has 45 employees. It intends to sell directly to customers, though it will also look to Web-development firms to recommend it to their clients. It will charge a relatively low up-front charge and a recurring fee thereafter. Kirsch has lined up a stellar group of angel investors in the company, including Colin Powell, Marc Andreessen, Andy Grove, Michael Dell and Meg Whitman.

### Soliloquy (D)

An oft-cited advantage of brick-and-mortar stores is the presence of knowledgeable salespeople, who can listen to customers' concerns and assist with completing purchases. Soliloquy is attempting to level the playing field between online and physical showrooms by offering virtual retailers the ability to do the same thing for their users, without the high overhead of a human sales force.

Soliloquy creates user interfaces that use natural-language processing to facilitate e-commerce transactions. The company's first product, Pick-a-PC, helps people select a computer that suits their needs. By helping customers obtain products well suited for their needs (for example, the system would recommend lightweight and durable laptops to a user who identifies herself as a frequent traveler), the technology can improve the customer experience and increase the number of transactions.

The New York-based company is nearly three years old, though it is just now bringing its service to market. Soliloquy originally focused on speech recognition, and it built a top-flight technical team that includes eight PhDs and 20 Masters degrees among the company's 35 employees. However, founder and ceo Catherine Winchester eventually concluded that the market wasn't ready for speech as a primary interface for e-commerce. Though Soliloquy still plans to offer speech interfaces some day, it now concentrates on the conversational interface that was at the heart of its effort all along.

The key to making Soliloquy's technology viable in the marketplace, Winchester says, was recognizing the need to optimize it for particular product categories: "We're focusing on specific vertical markets because in order for natural language to work well you need to limit the knowledge domain." Target markets include computers, consumer electronics, and financial services, all of which involve complex, high-value goods.

Soliloquy plans to license its technology both to PC manufacturers and to intermediary sites. So far it has signed deals with HP, ZDNet and Acer, and it has an agreement with CNet to use that company's vast PC configuration database as content for its offering.

Winchester cites three major benefits of Soliloquy's offering: decreasing costs by reducing the need for customer-service representatives, increasing sales because customers are better informed and served, and mining the dialogues for information to improve business methods. "We are capturing every single conversation and logging it and data mining it," she says, hastening to add that user privacy is protected and every partner controls its own data. She emphasizes that this “dialogue mining” provides more useful information than traditional clickstream analysis, “because people are telling the Website in their own words what they are looking for.”

Cto Mark Lucente, who joined Soliloquy from IBM Research, cites the speed with which the system can respond to customers’ requests as a big plus over human salespeople. “It’s an interaction similar to the way humans interact with humans,” he says, adding that, “computers can do some things better than humans.” In a recent usability survey, 83 percent of Pick a PC users actually said the experience felt more credible and intelligent than chatting with a live person.

Soliloquy distinguishes itself from others in the natural language space such as Neuromedia (a 1999 PC Forum company presenter) by emphasizing the turnkey nature of its system. Lucente observes that retailers and PC OEMs “don’t want to build this themselves; they want to buy it.” Rather than sell technology or toolkits, Soliloquy sells complete interfaces for specific product categories.

Soliloquy’s technology is built around meaningful dialogue. “Conversation means a progressive refinement. It means you build on the context,” states Lucente. When requests are very complex, the product can summon a human to continue the conversation, but Winchester believes Soliloquy can solve about 80 percent of consumer problems through its automated system.

### Spotlife (D)

Spotlife ceo Amit Goswamy thinks his company has the killer app for Webcams and digital cameras. He should know. The company (with Goswamy) was spun out of Logitech, the leading Webcam vendor. There will be four million digital cameras sold this year, but most people that buy them don’t know how to use them to broadcast content over the Net. Logitech executives saw the potential of a personal video broadcast service, Goswamy explains, but “as they looked at the idea, they realized it was very different from their core business.” So Logitech spun off Spotlife last July as an independent company, retaining a minority share. The new startup, located in San Francisco, raised additional funding from CMGI @Ventures and Atlas Venture; it now has about 30 full-time employees.

“The whole vision of the company is to democratize access to Internet video broadcasting,” Goswamy proclaims. He continues: “Every mainstream consumer should be able to press a button and go live on the Net.” To reach that goal, Spotlife has developed software that will be bundled with all Logitech Webcams and available free from its Website.

Spotlife will also make the software available free to other vendors; Goswamy is confident that because Spotlife is an independent company it will be able to convince Logitech competitors to partner with it as well. With Spotlife’s software, becoming a video broadcaster is a one-button process. The company supports both audio and video broadcasting, as well as static, stored or live streaming content.

Spotlife's free service will allow charter members one hour of broadcast time per week to 25 simultaneous viewers, along with 15 megabits of storage space on the Spotlife site. Additional capacity will be available for a fee. Users can password-protect their personal broadcasts, or they can make them publicly available on the Spotlife site, which will organize them into channels and will highlight the most popular ones. The service is designed to operate with a 56 kbps modem; even a 28.8 kbps modem will suffice for viewing broadcasts. At those rates, we're not talking about TV-quality video, but Goswamy says for the kind of personal content Spotlife is aiming for, that's not the point. "You give up a lot on quality if you're watching something you care about," he observes.

Do ordinary consumers really want to become Web broadcasters? Goswamy thinks customers will use Spotlife's service for informational, communications and entertainment purposes. "There is a time and place for written e-mail, but other than the memos you have to send, why would you ever not simply speak into your camera?" he asks. Geographically dispersed family members could use the service to see one another, he says, offering another example. In the end, though, users will figure out the applications once the barriers to personal broadcasting go away.

### Support.com

Support.com, formerly Tioga Systems, formerly Replicase, has done more than change its name over the past year and a half. Along with competitors such as Motive (see **Release 1.0**, 10-98), it was one of the pioneers of online technical support, offering self-healing technology that could automatically diagnose and repair application conflicts. The opportunity is huge: According to IDC, the overall support market is expected to reach $30 billion in 2003, nearly half of that online. And as Support.com co-founder and chairman Mark Pincus notes, improving support is important. "The help desk can't be a huge bottleneck, or it could prevent the growth of any knowledge-based usage of the Net," he says.

Though the company's healing agent and probe technology remains a differentiator, customers demanded a more comprehensive solution. "We started off trying to attack the complexity issue before we packaged it into a market-specific solution," Pincus explains. Automatically solving an end-user's problem is most useful in the context of an integrated support portal. Today, Support.com's eSupport Suite assists both users and help desks in requesting help, identifying and communicating problems, determining solutions and implementing them. The company hired former HP executive Radha Basu as CEO last July, and it recently filed for an IPO.

"There was a real lack of tools and solutions that would get used by support professionals and ultimately used by end-users," Pincus says. "Users have tons of options available for self-service support, but they don't use any of them. Help desks have tons of options such as knowledge bases, but they don't use them either." For online support tools to be used, he argues, they must be integrated into the normal flow of the user experience. And users must be convinced they will save time. If users believe the fastest solution is to pick up the phone and call the help desk, that's what they'll do, regardless of what else is available.

Support.com transforms support from a pull model -- customer service representatives asking questions to users on the phone -- to a push model in which configuration information is automatically pushed over the Net from the user desktop to the help desk. Users can type a question into a support portal page by clicking a button on their desktop, where it's automatically categorized using contextual data about their computing environment. The system then routes the user as appropriate. In many cases this allows the problem to be resolved without human intervention, resulting in cost savings for the support provider. Even when the help desk must still interact with a user, Support.com's technology makes the process quicker and more efficient.

Pincus believes online support is critical. "As people's lives are much more centered around the PC and the Web, their tolerance for bad software and crashes is going way down," he says. In many cases, technical support is the only ongoing relationship vendors have with their customers, and some companies such as LinuxCare have made Web-based support the basis of their entire business.

Support.com focuses on potential markets that currently experience the greatest pain in the support process, including corporate information technology departments, ISPs, ASPs, and support outsourcers. Customers include JCPenney, Excite@Home, Everdream and Computer Sciences Corp.

### Terabeam (D)

Bandwidth is the raw material of the Internet age. Despite constant technological improvement in both local and wide-are connections, it's still expensive and often impossible to deliver the bandwidth users demand. Terabeam has developed a novel solution, using optical laser technology to deliver massive amounts of bandwidth to businesses. There's no better way to explain the technology than to demonstrate it, so in addition to debuting as a company at PC Forum, Terabeam will provide high-speed Internet connectivity to the conference.

Terabeam founder and ceo Greg Amadon saw a gap between the capacity of desktop PCs, which can now support gigabit Ethernet, and long-haul backbone networks, which also run at multi-gigabit rates. The municipal-area networks and local loops in the middle are the bottleneck. Services such as digital subscriber line (DSL) and wireless offerings from Winstar and Teligent, as well as traditional T-1 and T3 lines, provide multi-megabit connections into buildings, but virtually the only way to achieve gigabit connectivity is through hugely expensive fiber optic cables.

Terabeam hopes to change all that. "We're rolling out a system that breaks the local-loop bottleneck, and lets us provision services from the WAN at very high speeds and lower cost to the LAN," promises Amadon. Terabeam supports wireless connections up to a gigabit per second, with antennas about the size of those used for direct-broadcast satellite.

"Our big idea was to take point-to-point laser communications technology, which has been around for about 10 years, and invent the five or six things that needed to be invented so that you could turn point-to-point communication into a point-to-multipoint network," says Amadon. The company started developing the technology in 1997, and built a prototype system that has been running for about 18 months in Seattle, where the company is headquartered. This fall it provided connectivity to the Internet 2 conference in Seattle, demonstrating its ability to support video conferencing and other advanced services. Terabeam has been funded by Softbank and Oak Hill Ventures, and it plans to launch commercial service this year.

In addition to a level of bandwidth and prices well below competing solutions, the Terabeam system can be deployed quickly. Terabeam will establish hub sites throughout a metropolitan area, networking them together with its own technology, then deploy antennas to connect customer sites to the nearest hub. “We effectively throw a transparent web of light over the downtown core,” Amadon says.

Unlike most broadband fixed wireless technologies, Terabeam’s signal passes through windows, meaning that antennas need not be deployed on rooftops. The requirement to negotiate rooftop access arrangements with building owners has been a major drag on other systems. And because the antennas are extremely directional, imaging only a 30-foot diameter circle, many of them can be pointed at the same hub site. Terabeam can therefore easily deploy more bandwidth as needed, Amadon says, up to hundreds of gigabits at a single hub.

The spectrum Terabeam uses is unlicensed, so the company avoids the expense of purchasing spectrum at FCC auctions. Because it’s an optical technology, the system requires a line-of-sight connection between a hub and the target building. Most weather conditions don’t interfere with the signal, except possibly heavy fog or snow that impedes visibility.

Of course, few companies today are ready for gigabit bandwidth. Terabeam will initially offer connections to individual companies in the multi-megabit range, with the ability to burst to higher speeds on demand. It will then scale up its network as necessary to handle additional demand. Amadon sees applications such as connecting remote offices to existing gigabit LANs as good early opportunities, but he’s also confident that once Terabeam makes the bandwidth available, customers will find ways to make use of it.

### ViaFone (D)

Last year there were more than 200 million wireless phones sold worldwide, far eclipsing shipments of PCs. And wireless devices are increasingly capable of carrying data, starting with PDAs such as the Palm VII and continuing with smart digital phones (see **Release 1.0**, 4-99). By the year 2003, it’s expected there will be one billion mobile phones in use, 60 percent of which will support wireless Internet services.

ViaFone was founded to integrate e-commerce with wireless devices, creating a new category it calls mobile commerce. The company, based in Redwood City, recently closed its first venture round of over $10 million, led by Draper Fisher Jurvetson and Partech. Co-founder and chairman Bernard Desarnauts, formerly with NetObjects, thinks the wireless Internet is at about the same place the Web was in 1995: beginning to reach the popular consciousness, with some early players actively building companies, but still very early in the process. But he expects the ramp-up process to be much quicker for wireless. “Expanding from the Web to wireless is a much simpler change for companies and customers than going from being an old-fashioned business to an e-business,” he says.

However, offering wireless access isn’t simple for existing Web businesses, especially those engaged in e-commerce. There are numerous different technologies to support, from the wireless access protocol (WAP) to the Palm VII’s Web Clipping to speech processing, and delivering services to wireless devices means integration with telecommunications networks, an area where online retailers aren’t likely to have expertise. And it’s not possible to surf a Web page on the tiny four-line screen of most wireless phones, so interfaces must be remapped to be usable.

ViaFone has developed a hosted platform that allows online merchants to wireless-enable their services quickly and efficiently. The company has created an XML-based middleware layer, developed in Java, that connects with the e-commerce site’s databases and transaction servers. It then adapts the information as necessary to deliver it to wireless devices, with either voice recognition or data interfaces. ViaFone is integrating key components from vendors such as Oracle and Nuance, so that it can offer merchants a complete turnkey system. “As an application service provider, we can develop the solution much quicker and cheaper” than merchants themselves, Desarnauts says.

Co-founder and vp of business development Josh Stein explains that ViaFone saves merchants the cost and complexity of deciding which wireless platform to support. “We focus on mobile rather than on WAP or Palm or voice,” he says. “We think those are all components of a mobile strategy.” ViaFone can quickly add new wireless data platforms to its service as they become popular.

Today, with the soaring popularity of wireless devices, there’s great pressure on all Internet companies to have a wireless strategy, but it’s not yet clear which applications will drive usage. Desarnauts acknowledges that the shape of mobile commerce isn’t yet clear, though he thinks greater personalization will be an important element because the mobile devices themselves say something about you as an individual. “With the wireless Internet, you really get the information you want and the transactions you want, wherever you are and on whatever device,” he says.

While there are some services on the market today that promise to enable Web content for the wireless world, these tend to focus on the simpler problem of reformatting HTML to fit small screens. To truly support commerce in a wireless environment, Desarnauts argues, requires “a rethink of the user model and the information design to fit the new devices.” Plugging into back-end systems, so that users’ ordering profiles can be incorporated, for example, is also important.

Within a year, Stein points out, it won’t be possible to buy a new digital wireless phone that doesn’t incorporate WAP. At that point, applications rather than demand will be the greatest limiting factor for the market. “The technology is all there,” Stein concludes. “It’s really a matter of whether people like us can help the merchants create and deliver the applications that drive adoption.”

## X-Collaboration

Groupware applications such as Lotus Notes were a significant productivity booster when they were first introduced, but they are tied to the pre-Internet client-server computing model. What would true Internet-centric groupware, or “post groupware” (see **Release 1.0**, 6-99), look like? X-Collaboration founder and chairman Kevin Lo thinks he has an idea.

A former consultant at Bain & Co., Lo saw two emerging trends in business: the increasing use of teams, and efforts to outsource mid-office operations. The problem was that both required an ability to collaborate across traditional organizational boundaries, which existing software wasn’t designed for. Lo describes X-Collaboration’s opportunity from a potential customer’s perspective: “If I could work effectively across company boundaries, and had the opportunity to integrate third-party resources into my company, it would dramatically change the way I structure and run my business.”

Before trying to build a solution, Lo spent months literally following teams in various companies around with a stopwatch. At the end of his research, he concluded that teams spent 60 percent of their time engaging in team-centered activities, a figure that was surprisingly consistent across different industries and company types. Though many companies had groupware solutions installed, they weren’t meeting their needs. Applications such as Notes, Lo says, are too expensive and complex, and fundamentally aren’t built to take advantage of the Net. “Thinking about how people work together over the Web, it’s not just supporting the business processes themselves,” he explains. “It’s also the ability to integrate third-party resources.”

“Collaboration is a dangerous word,” Lo acknowledges. Though collaboration between people inside and outside companies is at the heart of how businesses operate, discussions of collaboration technology usually focuses on specific functions such as conferencing and document sharing.

X-Collaboration has taken aspects of several traditional categories, such as document management, groupware, knowledge management, workflow and project management, and rolled them into a hosted, Web-based offering. Lo describes it as “process support that helps people work together more effectively.” The service uses a document metaphor to organize projects involving teams that can be dispersed geographically and across companies. It is tightly integrated with desktop applications such as Microsoft Office, because X-Collaboration recognizes users are unlikely to change the way they work in radical ways to gain the benefits of collaboration. Content and metadata are automatically added to an XML-based data store, which is published to a Web-based interface. X-Collaboration integrates administration and security to manage access to resources.

Lo sees X-Collaboration’s offering as particularly valuable for consultants and other professional services companies. “Every professional services firm wants to get more integrated with its clients,” he says. Having watched, or even helped, companies such as Dell and E*Trade disrupt major industries using the Net as a distribution channel, these firms realize the same will happen to them unless they adapt their processes. Using X-Collaboration, consultants can put themselves and their clients on the same platform, and can quickly integrate pre-defined methodologies and templates into their work.

As an ASP, X-Collaboration charges monthly fees to its customers based on the number of users, though it also offers a traditional server license. Lo believes that eventually, as X-Collaboration convinces companies as well as vertical content providers to use its platform, it will also be able to generate revenue through micro-transaction charges. For example, a lawyer could build a contract through a legal portal, with X-Collaboration providing the underlying collaboration engine.

**COMING SOON**

- *The Net in the educational process.*
- *Web aggregators.*
- *Directories, meta-directories and meta-meta directories.*
- *Personalization gets personal.*
- *And much more... (If you know of any good examples of the categories listed above, please let us know.)*

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